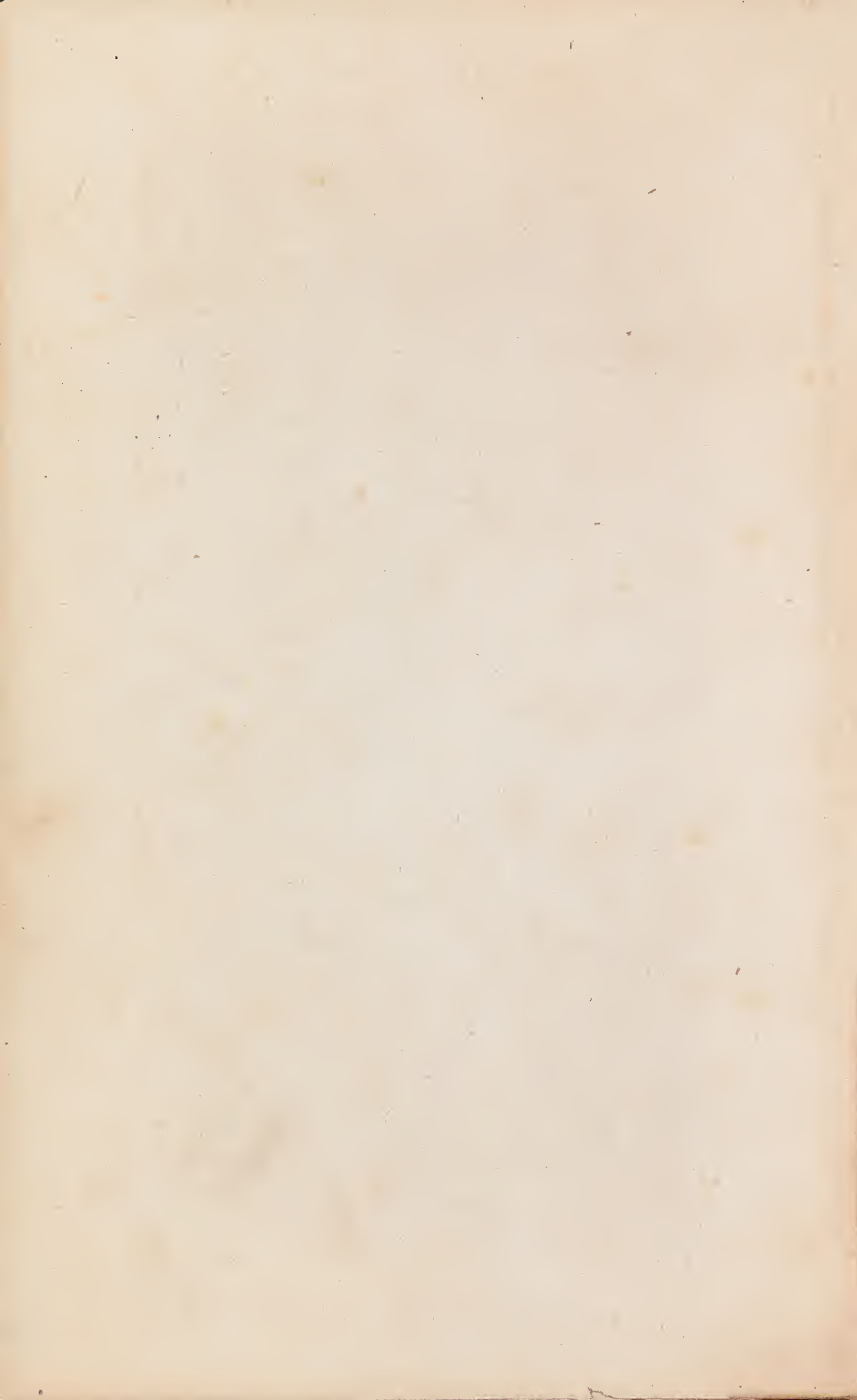


TORREY'S  
MEDICAL BOTANY.













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A

Medical Botany

Bay

John Torrey,

Professor of Chemistry, and

Botany,

College of Physicians, and Surgeons,

of  
The University of the State of

NEW YORK.



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1

General History

of

the Empire

of the Romans

by

John Smith

of the University of Oxford

1788



# Outlines of Botany ;

## Structural, physiological, systematical and medical

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### 1. Structural and Physiological Botany

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1. Plants consist of a hygro-metrical membranous transparent tissue, chemically composed of oxygen, hydrogen carbon & nitrogen. They also contain many mineral substances derived from their food & deposited in their tissue


2. Their component parts are held together by an organic mucus, out of which the tissue itself is generated

There are five kinds of tissue, viz. cellular, woody, vascular, pitted, and lenticiferous, each of which has certain modifications constituting the Elementary Organs

#### 1. Elementary Organs.

3. Of these Cellular Tissue is the only form universally found in plants.

4. This is composed of vesicles, the sides of which are not originally perforated by visible pores.

5. Each vesicle is a distinct individual, cohering with the vesicle with which it is in contact; and originating in a primitive point or cytoblast 



6. The membrane therefore that divides two contiguous cells is necessarily double. If the adhesion be imperfect, the spaces between the cells are called intercellular passages.

7. The sides of cellular tissue are often thickened by deposit,





## Elementary Organs.

on their inner surface, of matter of lignification or sclerogen.   which is stratified, and often pierced with passages leading to the circumference.

9 The cells contain fluid; grains of coloring matter (chromule); starch in granules; and crystals, which, when acicular are called raphides.

10 The vesicles of cellular tissue when slightly pressed together acquire a dodecahedral appearance, with an hexagonal section;



stretched lengthwise they become prismatical, cylindrical fusiform, &c.



cylindrical



fusiform



branched



sinuous



stellate



fibro-cellular.

(a fibre within a vesicle)

11 Cellular tissue, also called Parenchyma, constitutes all the pulp parts; the medulla or pith, the medullary rays, a portion of the bark, & the material between the veins of the leaves. It sometimes acquires excessive hardness by the deposit of sclerogens.

12 Fusiform cellular tissue is called prosenchyma.

13 The function of cellular tissue is to transmit fluids in all directions; the membrane of which it is composed is therefore permeable, although not in general furnished with visible pores.

14 Cellular tissue is self-productive, one cell generating another upon its surface, from cytoblasts produced in the organic mucus.

15 Pitted Tissue (Bothroenchyma), is a modification of the cellular, either consisting of cylindrical cells placed end to end, opening into each other; or originally tubular. Its



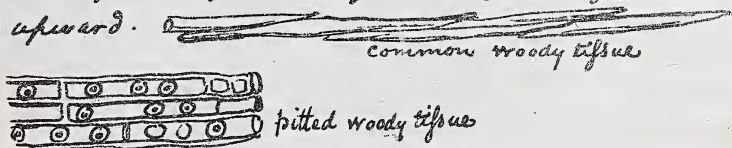
sides are marked with pits, resembling dots produced in consequence of the sclerogen being deposited unequally over the inside of the cells. Its office is to convey fluids with rapidity in the direction of the woody tissue that surrounds it.

## Elementary Organs.

3

16 Woody Tissue (Pleurenchyma) consists of elongated tubes, tapering to each end, and, like the vesicles of cellular tissue, imperforate to the eye. From that tissue it is distinguished by its cylindrical form, great length, extreme fineness, and toughness.

17 It constitutes the chief substance of wood, & is found in the parenchyma of the liber & in the veins of the leaves, or other appendages of the axis. Its functions are to give strength to the vegetable fabric & to serve for the passage of fluids from below upward.



18 Vascular Tissue (Trachenchyma) consists of very thin-sided cylinders, tapering to each end, and having a spiral fibre generated within.

19 They are found in the medullary sheath and in all the parts that proceed from it, especially the veins of the leaves, petals &c.; but are usually absent from the wood & bark



Common vascular tissue

20 They seem to be intended for the conveyance of air.

21 Ducts are transparent tubes, the sides of which are marked with rings, bars or transverse streaks.



22 They are slight modifications of the spiral vessels, differing principally in being incapable of unrolling, and, in some cases, in the turns of the spiral being distant, or broken

closed, broken ducts

23 They occur among the woody tissue of herbaceous plants, & in the wood of ferns & lycopodiums; also in the loose cellular tissue at the extremity of roots. Their functions are not well known.

24 Laticiferous Tissue (Cinenchyma) consists of uninterrupted anastomosing tubes, the







## Elementary Organs

final divisions of which are extremely delicate. It forms the proper vessels of old writers, & conveys latex, a peculiar fluid, usually turbid, and colored red, white or yellow; often, however colorless.

25. It principally occurs in the liber of Exogens, whence the ramifications proceed to the surface of all the organs, & penetrate the hairs, where they form a most delicate net work.

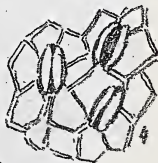
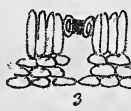
26. The use of this tissue is to carry the latex to all the newly formed organs, which are supposed to be nourished by it.

27. These five kinds of tissue, with their modifications, are the only forms known. Air vessels, Reservoirs of oil, Lenticular glands, are all either distended intercellular passages, or cavities built up with cellular tissue, or large cells filled with peculiar secretions.

28. All these forms of tissue are enclosed within a skin called Epidermis, which is made up of one or more layers of parenchyma, the vessels of which are compressed, & in a firm state of cohesion. It is spread over all the parts of plants which are exposed to the air, except the stigma and parts habitually living under water.

29. It is itself <sup>protected</sup> by an extremely thin pellicle called cuticle, which covers every part except the opening through the stomates.

30. Stomates are oval spaces lying between the sides of the cells, opening into intercellular spaces in the subjacent tissue,



and appearing to be bordered by a limb when viewed from above. This appearance is owing to the juxtaposition of 2 elastic vesicles, closing up or opening the aperture which they form.

31. They are found abundantly upon the leaves, particularly on the lower surface, occasionally also on organs that are modifications

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## Compound Organs.

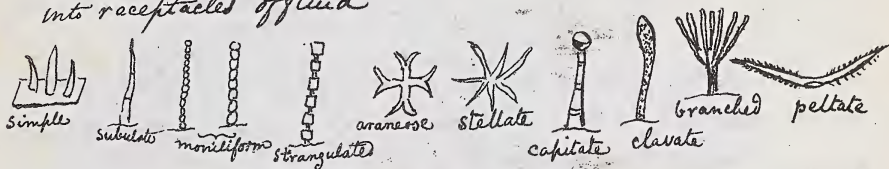
of leaves; & on the stem. They have not been found on the roots nor on colorless parasitical plants, nor the submerged part of plants: they are, moreover, rare, or altogether absent, in succulent plants & in seeds.

32. The function of stomates is to regulate evaporation and respiration

33. Hairs are minute expansions of transparent cellular tissue. They are of two kinds, lymphatic & secreting

34. Lymphatic hairs are formed by vesicles of cellular tissue placed end to end & not much varying in dimensions

35. Glandular hairs are formed by vesicles of cellular tissue placed end to end, & sensibly dilated at the apex or base into receptacles of fluid



36. Lymphatic hairs are for the absorption of moisture & for the protection of the surface on which they are placed

37. Glandular hairs are receptacles of the fluid peculiar to certain species of plants: as in the sweet-briar & nettle. They may be regarded as organs of excretion

38. Prickles are conical hairs of large size, with very hard tissue.

## II. Compound Organs.

39. These are formed of peculiar combinations of the elementary organs, & consist of the axis and its appendages.

40. The Axis is formed from an embryo or leaf-bud, by the development of a root in one direction, & of a stem in the opposite direction.

41. An embryo is a young plant produced by the agency of

stamens and pistils and developed within a seed.

42. A leaf-bud is a young plant, produced without the agency of stamens & pistils, enclosed within rudimentary leaves called scales, and developed on a stem.

43. An embryo propagates the species, a leaf-bud the individual.

44. When the vital action of an embryo or bud is excited, the tissue develops in three directions, upwards, downwards & horizontally.

45. That part which develops downwards is called the descending axis or root; that upwards, the ascending axis or stem; that horizontally, the medullary system; and the part from which the two axes start is called the crown, or collar.

46. In the lower tribes of plants, however, the developement is often in only one or two directions.

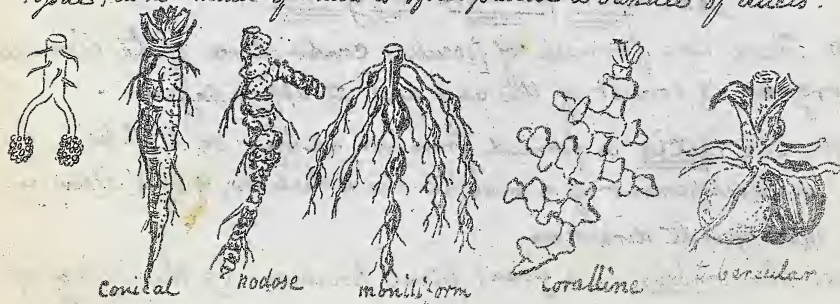
### III. Root.

47. The root is formed by the descending and dividing fibres of the stem, from which it differs anatomically, in the absence of normal buds, and of stomates (30), and in Exogens, of pith.

48. Although the root has no distinct pith in Exogens, yet it possesses a distinct medullary system.

49. The functions of the root are to fix plants in the earth, & to absorb nutriment from it, & it lengthens exclusively by successive additions to the points of its divisions.

50. Absorption in the roots takes place almost exclusively by the extremities called spongelets or spongioles, which consist of a lax coating of cellular tissue lying upon a concentric layer of woody tissue, in the midst of which is often placed a bundle of ducts.





51. Most thick roots contain stores of nutritious matter upon which the young stem feeds. They must not be confounded with rootstocks or corms, which are forms of stems.

#### IV. Stem.

52. The stem is produced by the successive developement of leaf-buds (42), which lengthen in opposite directions

53. The matter which causes the increase of Exogenous plants descends from the leaf-buds, & the greater the number of these buds above a part the greater the diameter of that part.

54. In the spring the newly forming wood is to be traced in the form of organic fibres descending from the leaf buds; that which is most newly formed lying on the outside, and proceeding from the most newly developed buds.

55. The elongation of buds upwards gives rise to new axes, with their appendages; their elongation downward increases the diameter of that part of the axis which preexisted, and produces roots

56. The root, therefore, consists of extensions of woody tissue, & has no proper leaf-buds of its own.

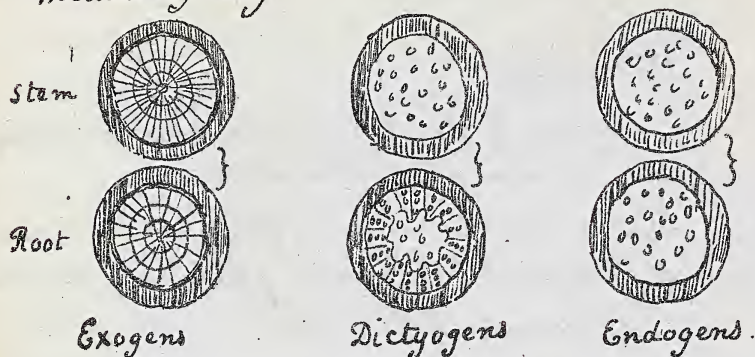
57 The leaf-buds thus successively ~~held together~~ developed, are held together by the medullary system of the stem, which proceeds from the bark inwards, connecting the circumference with the centre

58 The varies in structure in four principal ways: It is either formed ~~off~~ by successive additions to the outside of the wood, when it is called Exogenous; or by successive additions to its centre, when it is called Endogenous; or by the union of the bases of the leaves, and by addition to the point of the axis, or by simple elongation or expansion when no leaf-buds exist; this is called Aerogenous.

59 In what are called Dictyogens, the stem has the structure of Exogens, & the root that of Exogens nearly; Ex. Smilax

## Stem.

60. The stem of Exogens may be distinguished into the Pith, the Medullary Sheath, the Wood, the Bark & the Medullary Rays.

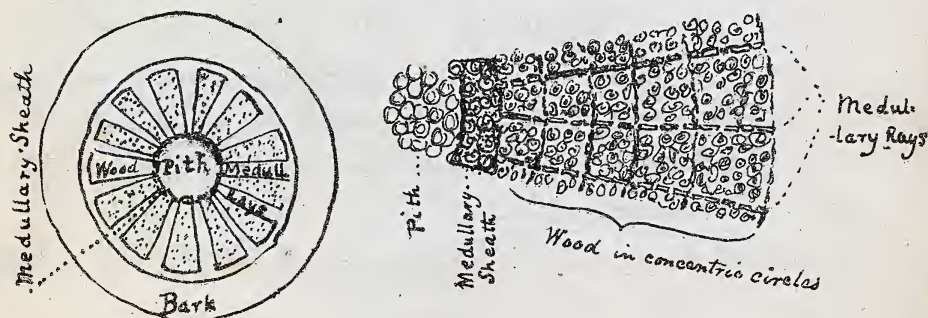


61. The Pith consists of cellular tissue, occupying the centre of the stem. It occasionally contains scattered spiral vessels. It is produced by the elongation of the axis upwards.

62. It serves to nourish the young buds until they are able to procure nourishment for themselves. For this purpose it is filled with starch, which becomes changed into mucilage, & then passes into the nascent organs. When it has performed this office it dies.

63. The Medullary Sheath consists of spiral vessels. It immediately surrounds the pith, projections of which pass through it into the medullary rays. It is in direct communication with the leaf-buds & the veins of the leaves.

64. It carries up the oxygen liberated by the decomposition of carbonic acid & water, and conducts it into the leaves.



Woody Stem of one year.



## Stem.

65. The Wood lies upon the medullary sheath, and consists of concentric layers

66. It is formed by successive deposits of organized matter descending from the buds, and by the interposition of the medullary system, here called medullary rays, connecting the pith and the bark.

67. The first concentric layer lies immediately upon the medullary sheath and pith, & consists of woody & vascular tissue. Each succeeding concentric layer, consists of woody & vasiform tissue, which, either form themselves into distinct strata, in which case the latter is innermost, or are confounded together

68. A concentric layer, once formed, never alters in dimensions. Each concentric layer is usually the produce of one year's growth & the number of concentric circles of wood should determine the age of an Exogenous tree. But disturbing causes often render the rule uncertain; & in warm countries, the period of rest is not distinctly marked.

69. The secretions of plants are mostly <sup>abundantly</sup> deposited in the oldest concentric layers; and when the tissue of the layers is filled with secretions, it ceases to perform any vital functions.

70. The dead & fully formed central layers are called the heart-wood

71. The living and incompletely formed external layers are called albumnum, or sap-wood

72. Upon the outside of the wood lies the Bark, which, like the wood, consists of concentric layers

73. It consists of four distinct parts: 1, Epidermis; 2, Epiphloeum

3, Mesophloeum; & 4, Liber; each of which increases by successive additions to its own inside, except the Epidermis.



## Stem.

74. The Epiphloem & Mesophloem are both formed of cellular tissue only, but their cells are placed in different directions with respect to each other. The former is often soft & may separate spontaneously from the young layers forming beneath it; as in Cork.

75. The Liber consists of cellular tissue, laticiferous tissue & woody tissue. The tubes of the last are often thickened by a deposit of sedimentary matter, so that sections of them appear like concentric circles.

Hence arises the toughness of the woody fibre in bark & the use of liber for cordage.



76. The secretions of a plant are often deposited in the bark in preference to any other part. Hence the medicinal & chemical principles are often to be sought in the bark, rather than in the wood.

77. The immediate functions of the bark are to protect the young wood from injury, & to serve as a filter through which the descending elaborated juices of a plant may pass horizontally into the stem, or downwards into the root.

78. It also contains the laticiferous vessels, by which the latex is conveyed to all parts of the surface of a plant.

79. The Medullary Rays consist of compressed parallelograms of cellular tissue (muriform . . .) belonging to the medullary system. These rays or plates form the silver grain of wood. They connect together the tissues of the trunk, maintaining a communication between the centre and the circumference.

80. They convey secreted matter horizontally from the bark to the heart-wood; and they generate adventitious buds.

81. Cambium is a viscid secretion, which in the spring separates the alburnum of an exogenous plant from the liber, & out of which the new elementary organs are formed.



82. The stem of Endogenous plants offers no absolute distinction of Pith, Medullary Rays, Pith & Bark; but is formed by the intermixture of bundles of vascular tissue, among a mass of cellular tissue, the whole of which is surrounded by a zone of cellular & woody tissue, inseparable from the stem itself and therefore not bark.

83. It increases by the successive descent of new bundles of fibro-vascular tissue down into the central cellular tissue, curving towards the circumference as they descend.

84. The vascular bundles of the centre gradually force outwards those which were first formed, the cellular mass augments simultaneously, & in this way the diameter of a stem increases.

85. What appears to be bark in Endogens is an external layer of cellular tissue into which the lower extremities of the fibro-vascular tissue descend obliquely, losing their vascularity as soon as they reach the spurious bark.

86. The diameter of an Endogenous stem is determined by the power its tissue possesses of distending, and by its hardness.

87. When the external tissue has once become indurated, the stem can increase no further in diameter.

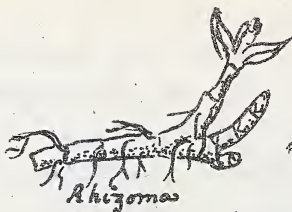
88. Generally the terminal bud only of Endogenous plants is developed; but very often a considerable number develop:  
Ex. Asparagus. In the former case it is cylindrical; the latter, conical.

89. In Acrogens the stem is formed by the simple union between the bases of the leaves & the original axis of the bud from which they spring, and which they carry up along with them. Ex. Ferns

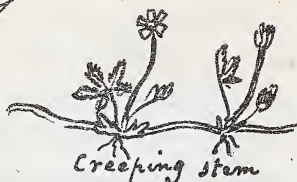
90. When Acrogens have no proper leaves, they are mere expansions of cellular matter, sometimes in all directions;  
Ex. Fungi; sometimes in particular directions; Ex. Lichens, &c.

91. The stem assumes numerous and very different appearances in different plants.

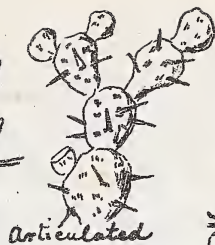
## Stem.



Rhizomas



Creeping stem

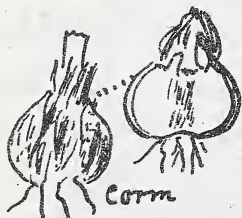


Articulated

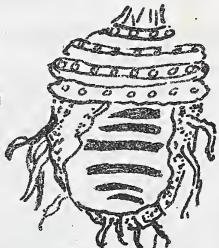


Scape

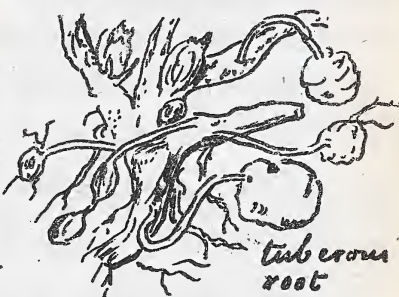
92. Many forms of stem are vulgarly called roots; such as the Rhizoma or rootstock, which creeps upon, or under the earth, emitting roots from its under side; tubers, which are produced by a thickening of the internodes, & the corm, which is a roundish under-ground distension of the stem



Corm



tuberous root.



tuberous root

93. No root can have either scales (which are rudiments of leaves), or nodes (which are rudiments of buds)

94. The ascending axis, or stem, has nodes and internodes. Nodes are the places where the leaves are expanded by the buds form; internodes are the spaces between the nodes.

95. Whatever is produced by the evolution of a leaf-bud is a branch

96. A spine is an imperfect evolution of a leaf-bud

## V. Leaf-buds.

97. Buds are of two kinds: Leaf-buds & Flower-buds

98. Leafbuds consist of rudimentary leaves surrounding a growing vital point, the tissue of which is capable of elongation, upwards in the form of a stem & downward in the form of root.



## Leaf-buds.

99. Flower-buds consist of rudimentary leaves surrounding a fixed vital point, & assuming, when fully developed, the form of floral envelopes, or the apparatus of stamens & pistils.

100. The two kinds of buds sometimes show a tendency to change into each other.

101. Within the scales of a leaf-bud is a center of cellular substance, coated with a thin stratum of spiral vessels & these two parts answer to the pith & medullary rays in Exogens.

101. By the growth of a leaf bud, a branch is formed; and the scales gradually change into true leaves as vegetation advances.

102. Sometimes they separate spontaneously from the stem; when they are called bulblets.

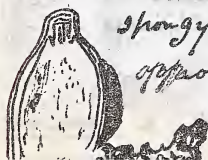
103. Bulbs or Scaly bulbs, are merely underground buds of large size, filled with nutriment.

104. In the axils of the scales of bulbs, young buds or bulbs (cloves) are often formed, as in Garlic, and then gradually destroy the old bulb by feeding upon it. In like manner corms produce other corms at the axils of their scales, & are destroyed by their offspring.

(The figure represents a corm of *Gladistus* with the vestiges of preceding corms at its base)



The Colchicum bears its parent in the form of a shrivelled spongy lump on one side of its base, while on the opposite side a new bud is prepared, by which the parent will hereafter perish.



## Leaf-buds.

105. Leaf-buds are of two kinds, the regular and the adventitious.

106. Regular or normal leaf-buds are only found in the axils of leaves. They exist in a developed, or undeveloped state in the axils of all leaves, & of all modifications of leaves.

107. Leaf-buds which are formed among the tissue of plants subsequently to the development of the stems and leaves, are called latent, adventitious, or abnormal.

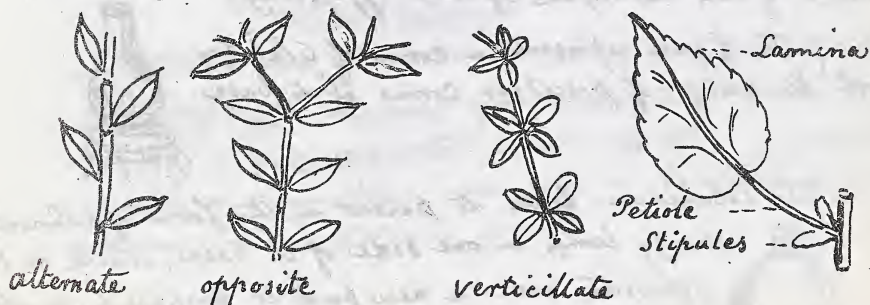
108. Adventitious Leaf-buds are formed in the root, among the wood, & at the margin or on the surface of the leaves.

109. Embryo buds are woody nodules found in the bark of trees, and apparently rudimentary branches formed without leaves from being forcibly pressed upon by the surrounding tissue.

## VI. Leaves.

110. A leaf is an expansion of the bark immediately below the origin of a regular leaf-bud.

111. Leaves are developed alternately, one above and opposite the other, around their common axis. but sometimes, in consequence of the internodes ( ) being unequally developed, leaves become opposite, or verticillate.



112. A leaf consists of a petiole or stalk, a lamina or blade & a hair or stipule.



113. The Petiole is the channel through which the vessels of the leaf are connected with those of the stem. It is formed of one or more bundles of spiral vessels and woody tissue, enclosed in a cellular integument, which is a continuation of that of the bark.

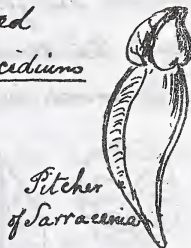
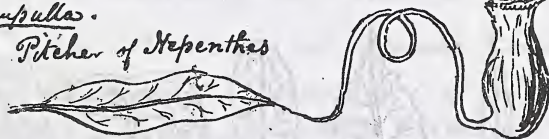
114. The spiral vessels of the leaf of Exogens derive their origin from the medullary sheath; those of Endogens from the bundles of fibro-vascular tissue.

115. When the petiole is leafy & the lamina abortive, it is called a phyllodium.



116. When the petiole is dilated & hollowed out at its upper end; the <sup>lamina</sup> small & articulated with the orifice, it is called a pitcher or ascidium if it is an enclosed sac, it is called an ampulla.

Pitcher of Nepenthes



Pitcher of Sarracenia

117. The Lamina of a leaf is an expansion of the parenchyma of the petiole, & is traversed by veins which are ramifications or extensions of the bundles of vascular tissue of the petiole, or, when there is no petiole, of the stem.

118. Sometimes one, sometimes both the surfaces of a leaf are furnished with stomates.

119. In Exogens the veins usually branch in various directions among the parenchyma, forming a kind of net-work; while in Endogens they run parallel to each other, being connected by single transverse unbranched veins.

120. The principal vein of a leaf is a continuation of the petiole, & is called the midrib, its principal ramifications are called veins, & the subdivisions veinlets.

121. There are two strata of veins, the one belonging to the upper, the other to the under surface. The upper stratum conveys the juices from the stem into the lamina

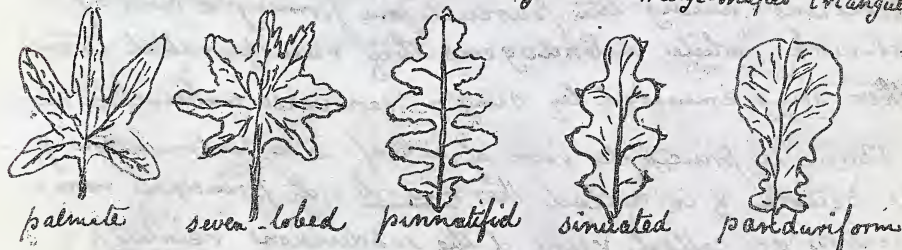
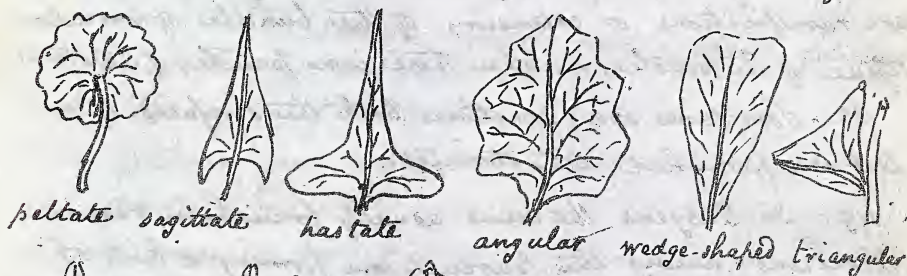
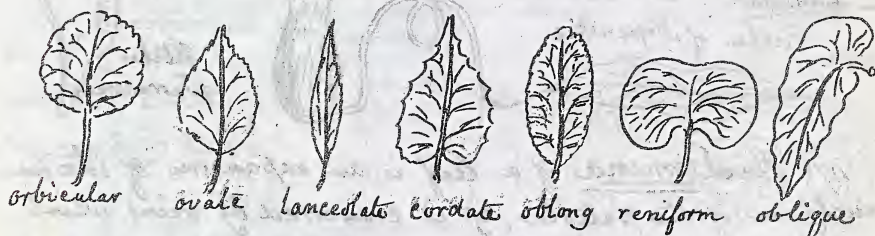
## Leaves.

for the purpose of being aerated & elaborated; the under returns them into the bark

122. The cellular substance of the leaf is often stratified beneath the two surfaces; the upper stratum being more compact than the lower & having its cells perpendicular to the plane of the leaf: in such cases the cells of the lower stratum are commonly more or less parallel with the under surface

123. A leaf is simple when its lamina is undivided; or when, if it is separated into several divisions, those divisions do not reach the midrib

124. The form of the simple leaf is extremely variable and the terms employed to denote the variations are numerous in proportion



125. A leaf is compound when the divisions pass down to the midrib so as to subdivide the leaf into smaller distinct leaves or leaflets (foliols)



## Leaves.

17

122. The following are forms of compound leaves



123. Stipules are attached to each side of the base of the petiole. They may be considered as rudimentary leaves. Sometimes they are transformed into leaves.

124. Whatever arises from the base of a petiole or of a sessile leaf, & attached to each side of it is a stipule.

125. When the margins of a stipule cohere & form a tube, surrounding the stem, it is called an ocrea.

126. All leaves are originally continuous with the stem; as they grow, an interruption of their tissue at their junction with the stem takes place, by which a more or less complete articulation is at length formed. When completed, the tissue of the leaf becomes interrupted by foreign matter, & when incapable of further action, it dies. The stem or branch continuing to increase in diameter & the dead leaf not increasing with it, the latter is thrown off. This is the fall of the leaf. In some Endogens the articulation is so slight, & the stem increases so little in diameter, that the leaf is never thrown off, but simply withers & decays.

127. The mode in which leaves are arranged within their buds is called vernation.

128. Leaves have, under particular circumstances, the power of producing leaf buds from their margin.

VII. Food and Secretions.

129. Plants are nourished by the absorption of food from the air & earth, in consequence of which they grow & produce their peculiar secretions

130. The food of plants always consists of carbonic acid, nitrogen & water, & also of various mineral matters, chiefly alkalies, the nature of which varies with the species

131. Carbon is obtained by plants in the form of carbonic acid, derived from the atmosphere, or generated in soil by the decay of vegetable matter.

132. Hydrogen is obtained principally by the decomposition of water, & is assimilated with carbonic acid, while the oxygen of the water is liberated

133. Nitrogen can only be obtained by plants in the form of ammonia. This compound exists in every part of plants, in the roots, the stems, & in all blossoms & fruits, in an unripe condition. It is supplied by rain water which carries it down from the air, ~~which~~ where it is always present, being derived from the putrefaction of plants & animals

134. The ammonia being taken up by the roots, & entering into the composition of the sap, its elements contribute to the formation of albumen, gluten & other compounds of which nitrogen is an ingredient

135. It is important that the ammonia be presented to plants in a fixed state, or in the form of salts, otherwise most of it is lost, on account of its volatility

136. Besides carbonic acid, water & ammonia, plants require other materials for their growth (1.)

137. One of the most important of these is phosphate of magnesia, which, in combination with ammonia is an invariable constituent of the seeds of grapes, including the various kinds of grains. Many plants also produce acids, which are necessary to their existence, & these acids require alkalies or earthy bases with which they may form



## Food & Secretions.

19

salts: The proportion of alkaline bases in a plant is indicated by the quantity of ash left after burning, & this varies in different species. Consequently different species demand a different amount of alkaline food in the soil.

138. When alkaline matters are wanting, or deficient, in a soil, the growth of plants will either be arrested, or impeded, in proportion to the deficiency.

139. Besides alkalis, plants require other substances, such as phosphoric acid, common salt, nitre, salts of iron & manganese &c; which are found in many species, & are probably essential to their healthy action, or even to their existence.

140. As soon as food is absorbed, it begins to ascend into the stems, or to diffuse itself through the system, & receives the name of Sap.

141. In the course of the sap upwards, the water and carbonic acid are partially decomposed, & their elements are deposited, along with nitrogen in the interior of the tissue forming a layer over the interior of every cell & vessel, which thus become in part solidified.

142. As soon as the sap reaches the leaves, or the surface of the bark, green matter, or occasionally some other color, is formed, provided the part is exposed to the light. This matter seems to be produced from the elements of carbonic acid, ammonia & water; the oxygen being restored to the atmosphere.

143. In the absence of light, plants reabsorb oxygen from the atmosphere & recombine it with the matters they contain, to be again liberated at the return of light. They also, at all times, especially at night, part with carbonic acid in small quantities. It is chiefly light, in conjunction with the <sup>vital</sup> forces, that causes the decomposition of the matters contained in living plants.

144. In darkness no assimilation of the food takes place; oxygen accumulates, its natural proportion to the other elements is disarranged, the plant becomes blanched, & then dies.

Food and secretions

145. From the continued assimilation of the elementary constituents of plants, new products result & serve for the formation of woody fibre & all solid matters of a similar composition. The leaves produce sugar, starch & acids, which previously, when necessary for the formation of stems, buds, leaves & branches, were formed by roots.

146. The motion of the sap upwards is caused by the newly developing leaf-buds, which constantly consume the sap that is near them, a fresh quantity being sent forward from the roots. The vessels which convey it possess a peculiar vital irritability.

147. The irritability of plants is also shown by other phenomena, such as sudden motion of the stamens when touched, the collapse of many leaves when stimulated, &c.

148. After the sap has been distributed through the veins of the leaves, and exposed to the influence of air & light, it undergoes peculiar chemical changes. When these are accomplished it is called the proper juice.

149. The juice then flows back & descends towards the roots, passing also horizontally into the center of the stems.

150. Hence the great importance of leaves to plants, & the necessity of exposing them to the full influence of light & air.

151. In Exogenous plants ( ) the upward course of the fluids is through the young wood; their downward passage through the bark, towards or into the root; & their horizontal diffusion takes place through the medullary rays.

152. Hence the peculiar principles of the Exogens, are, in trees & shrubs, to be sought either in the bark, or in the heart-wood ( ), not in the alburnum. In perennial herbaceous plants, the roots are the chief reservoir of the secretions; & in annuals, the stem and root of which last but a single season, the secretions are distributed equally through every part of the plant. In annuals they are found in the greatest abundance at the end of their growth.



153. In Endogenous plants ( ) the upward course of the fluids is probably through the bundles of vascular woody tissue, & the downward & horizontal passage through the cellular tissues.

154. The precise direction of the saps in Acrogens ( ) is unknown.

### VIII. Flower-bud.

155. The Flower-bud consists of a fixed point surrounded by imbricated, rudimentary, or metamorphosed leaves, the external or inferior of which are usually alternate, & the internal or superior verticillate or opposite. The latter constitute the floral envelopes, stamens, &  pistils.

156. The leaf, from the axis of which a flower bud arises is called a bract or floral-leaf; & all rudimentary leaves, of what size or colour soever, which appear on the peduncle (160), between the floral leaf & the calyx (192) are called bracteoles.

157. When a single bract (usually large & colored) is rolled together & placed at the base of that kind of inflorescence called a spadix (170), it is named Spatha.

158. Several bracts in a whorl, or imbricated, & placed around those forms of inflorescences called umbel, or head constitute an involucre :

159. In grasses, sedges, & many other plants that are destitute of proper calyx & corolla, the stamens & pistils are protected by peculiar bracts called glumes &  paleae. They are placed alternate with each other, & not verticillate, as in true floral envelopes.

160. The axis of a flower bud usually enlarges only below the floral envelope, forming a stalk which is called the peduncle. If this give off partial stalks at intervals, it is named a racine, & the divisions are called pedicels.

## Flower-bud.

161. A flower, with its peduncle & bracteoles, may be considered as a modified branch.

162. Its flower-buds can only develop from the axil of a bract; a pedicel without bracteoles can never produce other flowers, but, if furnished with these organs it can & often does, bear several flowers.

163. The manner in which the floral organs are arranged before expansion, is called aestivation or præstoration, of which the following are examples.



valvate



involute



plicate



induplicate



imbricate

164. The modes in which the flower-buds are arranged on the plant are called the forms of inflorescence; of the order in which they unfold is called the order of expansion.

## IX. Inflorescence.

165. The following are the principal kinds of inflorescence.

166. When no elongation of the general axis of a plant takes place beyond the development of a flower bud, the flower is said to be terminal & solitary.

167. The flower is called solitary & axillary when only a single bud unfolds in the axil of a leaf, the general axis continuing to lengthen.

168. A raceme is formed when a number of flower-buds, each on a pedicel, are produced on a common axis.

169. A spike differs from a raceme in the buds being without pedicels.

170. A spadix is a succulent axis, densely covered with flowers, & surrounded by a spathe. (157)

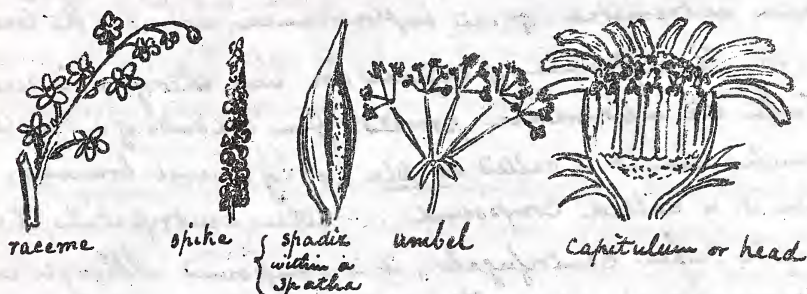
171. An amentum or catkin is a spike the bracts of which are all of equal size & closely imbricated, & the rachis of which is articulated with the stem.



## Inflorescence.

172. When a bud produces numerous flower-buds which are sessile & closely aggregated into a head, the inflorescence is called a capitulum

173. An umbel is formed, when the flowers are on elongated peduncles, which all proceed from the same point of the axis.



174. A panicle is a raceme the flower buds of which have produced other flower buds

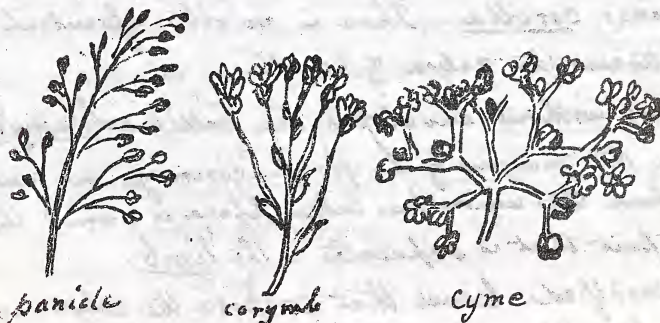
175. A raceme or panicle the lower flowers of which have long pedicels, & the uppermost short ones, is a corymb

176. A panicle the middle branches of which are longer than those of the base or apex is called a thyrsus.

177. When the panicle has the elongation of all its branches arrested, so that it assumes the appearance of an umbel, it is called a cyme

178. When the order of expansion is from below upwards, it is called centripetal.

179. When the upper or central flowers open first, & those of the base or circumference last, the expansion is called centrifugal.





## Inflorescence.

180. When the inflorescence is the result of the development of several branches, each particular branch follows the centripetal law of expansion, but the whole mass of inflorescence is centrifugal. This arises from the partial centripetal development commencing among the upper extremities of the inflorescence, instead of the lower.

190. The difference of expansion will therefore indicate whether the inflorescence proceeds from the buds of a single branch, when it is called simple, or of several branches, when it is called compound. When centripetal, it is simple; when centrifugal, it is compound, although in appearance simple. This difference is often of great importance.

## X. Floral Envelopes.

191. The Floral Envelopes are the parts that immediately surround the stamens & pistils.

192. They are formed of one or more whorls of modified leaves. From ordinary leaves they do not differ essentially, except in peculiar modifications of size or development.

192. When the envelopes consist of but one whorl of leaves, they are called calyx, whatever may be the color.

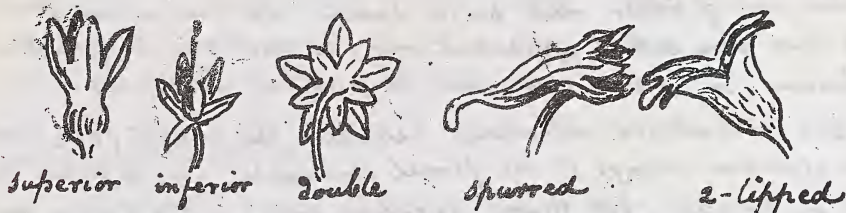
193. When there are two or more whorls, the outer is called calyx, the inner corolla. There is no other essential difference between the calyx & corolla.

194. Flowers without envelopes are called achlamydeous.

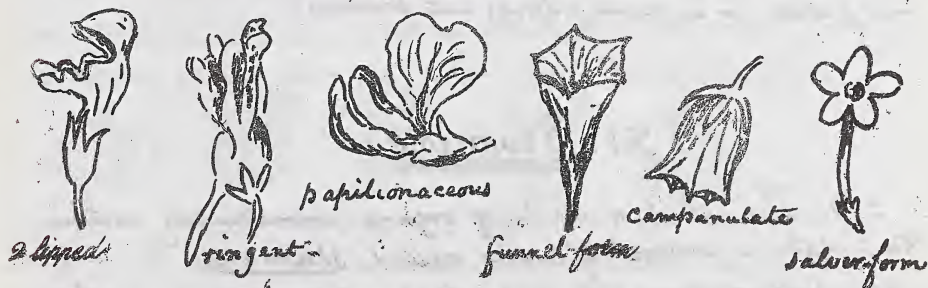
195. When the margins of the floral coverings are united the part where the union has taken place is named the tube, & the part that is separate is the limb.

195. The modified leaves that compose the calyx, are called sepals. When they are distinct the calyx is said

to be polysepalous; when they are more or less united by their margins it is called monosepalous or gamosepalous.



196. The modified leaves of the corolla are called petals. They are usually of some bright color, different from that of the sepals. If not united with each other, they are said to be polypetalous; but if growing together more or less, by their margins, the flower is called monopetalous or gamopetalous.



197. The corolla or calyx is 2-lipped, when the petals or sepals are united in two parts.

198. If the petals or sepals are unequal in size, the corolla or calyx is called irregular.

199. If there be five petals, of which the uppermost one is dilated, the two lateral ones contracted & parallel to each other, & the two lower contracted & united with each other by the front margin, the flower is papilionaceous.

200. When a petal tapers towards its base, the narrow portion is called the unguis, or claw, of the upper part the limb. The former is analogous to the petiole, the latter to the lamina of a leaf.

201. The normal situation of the petals is alternate with the sepals; if <sup>they</sup> arise opposite to the sepals it is owing to the abortion



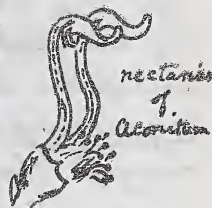
## Floral Envelopes.

of one row or whorl of petals between the sepals and those petals which are actually developed

201. No petals always alternate with stamens, the number of each row of either will be the same. All deviations from this law are either apparent only, in consequence of partial cohesions, or, if real, are due to partial abortions.

202. Whatever intervenes between the bracts (156) and the stamens belongs to the floral envelopes, and is either calyx or corolla; but many peculiar forms of the latter are called nectaries. There are however, no exact limits

between the corolla and the stamens, if there are parts which may either be regarded as stamens passing into petals, or as petals passing into stamens.

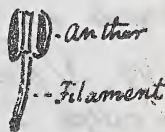


## XI. Stamens.

203. The whorl or circle of organs immediately within the petals is composed of bodies called stamens.

204. Each of these bodies usually consists of two parts; the filament & the anther.

205. The filament is composed of a bundle of spiral vessels, surrounded by cellular tissue. The anther is a terminal case containing a peculiar arrangement of the same tissue & finally opening & discharging its contents.



206. In many instances no limits can be traced between the petals & stamens: as in the White Pond Lily, or Nymphaea. In such cases the limb of the petals (195) contracts and becomes an anther, while the ungues assumes the form of a filament.

207. Now as there are no limits between petals and sepals nor between sepals & bracts (156), nor between bracts & leaves, it also follows that the stamens are likewise modifications of leaves.



208. The anther is a modification of the lamina of a leaf, of the filament of the petiole.

209. When the stamens are twice as numerous as the petals, it is considered that two whorls are developed. If they are equal in number to the petals of opposite thorns, the inner whorl only is developed; the outer one being abortive.

210. All deviations from these laws are owing to the abortion of some part of the stamens.

211. When the stamens do not contract any adhesion to the sides of the calyx, they are hypogynous.

212. When they adhere to the sides of the calyx they are said to be perigynous.

213. If they are united both with the surface of the calyx & of the ovary, they are epigynous.

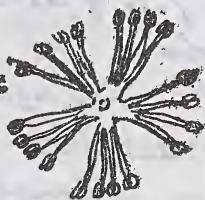
214. If of 4 stamens two are long & two are short, they are called didynamous; & where there are 6 stamens, four of which are longer than the others, they are tetradynamous.



hypogynous perigynous epigynous didynamous tetradynamous.

215. The filaments are either distinct, or united by their margins. If they are united into one tube they are called monadelphous; if in two parcels they are diadelphous; if in several, they are said to be polyadelphous.

216. When they are united in a solid body, along with the style, they form what is called a column, & are then gynandrous.



monadelphous

diadelphous

polyadelphous

gynandrous.

217. The filament of the stamen is often wanting, & then the anther is said to be seisile.

218. The substance formed in the anther and finally discharged from it, is called pollen.

## Stamens.

219. The two sides of the anther are called its lobes & the substance that connects them, (which may be regarded as a continuation of the midrib), is named the connective.

220. The connective is sometimes articulated with the filament, across which it hangs & on which it swings; in other cases it is forked & bears an anther lobe on each fork.

221. The cavities of the anthers containing the pollen are the cells, & the place by which the pollen is emitted is the point or line of dehiscence; the membranous sides of the anther are named the valves.

222. Dehiscence usually takes place along a line, which may be regarded as the margin of the leaf out of which the anther is formed. Sometimes only a portion of this line opens, & then the anther is said to dehisce by fores.

223. Sometimes the sides of the anther separate along the connective as well as at the margin & remain attached only at the top.

224. The cells of the anther are usually two; sometimes four; rarely several, or only one.

225. Sometimes the cells are folded & sinuous, or prolonged into tubes, &c.

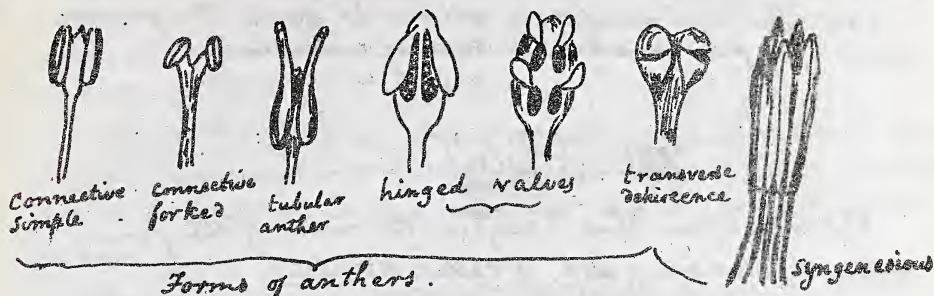
226. The line of dehiscence is occasionally transverse, & in other cases the face of the anther breaks away in several hinged lobes.

227. When anthers grow together by their margins, they are called syngenesious.

228. The Pollen is formed by a peculiar modification of the cells of the parenchyma of the anther. It consists of hollow cases, extremely small, containing a fluid in which float grains of starch & drops of oil. It is furnished with apertures, through which its lining is protruded in the form of a delicate tube, where the pollen comes in contact with the stigma.



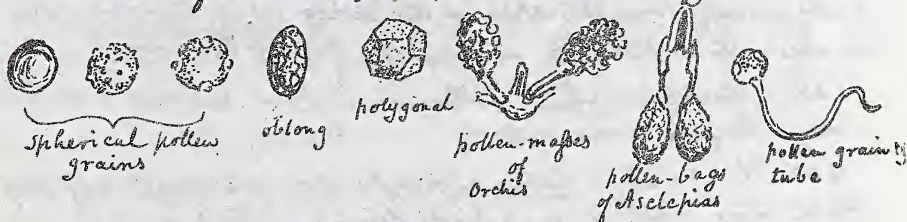
229. The shape of the pollen is variable; the more common forms are spherical, triangular, polygonal & oblong.



230. The surface of the pollen is either smooth, or studded with little points.

231. The grains are usually distinct from each other, but in some cases they cohere in definite numbers; or in irregular masses; or are enclosed within a bag. When they cohere, they are connected by a process called the caudicle.

232. The function of the pollen is to vivify the ovules.



## XII. Disk.

233. Whatever intervenes between the stamens of the pistil, receives the general name of disk. It usually consists of an annular elevation, encompassing the base of the ovary, when it is sometimes called the cup; or it appears in the form of a glandular lining of the tube of the calyx (as in the Rose) or of tooth-like processes at the base of the ovary.

234. When a fleshy substance occupies the centre of a flower, & bears a single row of carpels, it is called the gynobase. If it bears more carpels than a single row, it is called the torus or receptacle.



## Pistils.

235. The disk is a non-developed inner row or rows of stamens. The Linnaean botanists included it among the forms of the nectary.

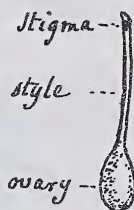
236. The receptacle or torus is merely the growing point of a flowerbud in a state of enlargement.

## XIII. Pistils.

237. The organ that occupies the centre of the flower, within the stamens & disk, is called the pistil.

238. It is distinguished into three parts; viz. the ovary, the style, and the stigma.

239. The Ovary is a hollow case containing one or more cavities, called cells, which enclose ovules (264).



240. The Stigma is the upper extremity of the pistil.

241. The Style connects the ovary & stigma. When it is absent, the stigma is said to be sepile. It usually proceeds directly from the apex of the ovary; but in some cases it arises from the side or even the base of that organ.

242. Strictly speaking, nothing is stigma but the naked-secreting surface of the style.

243. The pistil is either a modification of a single leaf or of one or more whorls of modified leaves. Such modified leaves are called carpels.

244. A Carpel is formed by a folded leaf, the upper surface of which is folded inwards, the lower outwards; and within which are developed one or more modified buds or ovules.

245. When the carpels are all distinct or are separable with facility, they are apocarpous; when they all grow into a solid body, they are syncarpous.

246. The ovary is the lamina of the leaf, the style is an elongation of the midrib ( ); the stigma is the more naked apex of the style. The part representing the petiole is usually wanting, but sometimes it is present & constitutes the stalk (the thecophore or gynophore) of the carpels.

247. Where the margins of a folded leaf out of which the carpel is formed, meet & unite, a development of cellular tissue sometimes takes place, forming what is called the marginal placenta.

248. Every such placenta, therefore, is composed of two parts; one of which belongs to one margin of the carpel & one to the other. In some cases, however, the placenta is a mere development of the centre of a bud.

249. As the carpels are formed of leaves turned inwards, their margins are necessarily turned towards the axis, & a placenta formed by the union of those margins will be invariably next the axis.

250. The normal position of the carpels is alternate with the innermost row of stamens, to which they are also equal in number; but this symmetry of arrangement is generally destroyed by the abortion or nondevelopment of part of the carpels.

251. The carpels often occupy several whorls; in which case they are usually distinct from each other.

252. When the carpels are arranged round a convex receptacle (234), the exterior ones will be lowest; as in the Raspberry.

253. If they occupy the surface of a tube, or are placed upon a concave receptacle, the exterior ones will be the uppermost.



254. When two carpels are developed, they are invariably opposite each other, & never side by side.

255. When carpels unite, those parts of their sides which are contiguous to each other grow together & form partitions between the cavities of the carpels. These partitions are called dissepiments, & they are necessarily formed of two layers; but sometimes they are so intimately united that the layers cannot be distinguished.

256. Such being the origin of dissepiments, it follows that: 1. all dissepiments are vertical, & never horizontal; 2. they are equal in number to the carpels out of which the pistil is formed: 3. a single carpel can have no true dissepiment.

257. As the stigma is the point of the midrib, it will ~~always~~ always alternate with the dissepiments, which are formed of the sides

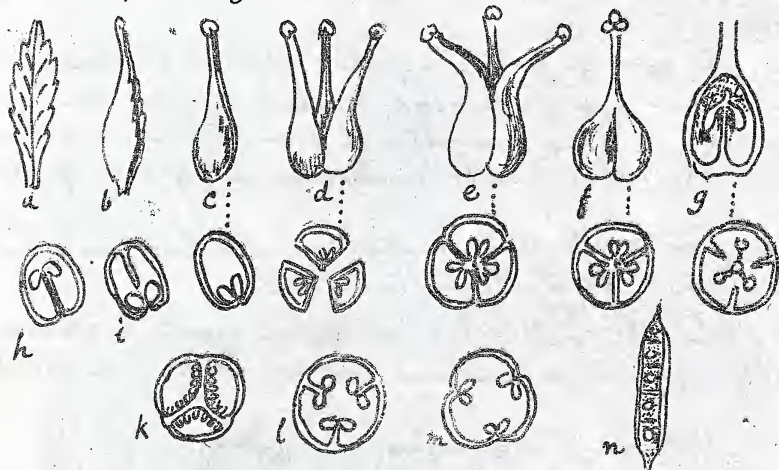


## Pistils.

of the carpellary leaf

258. Sometimes the ovary is only one-celled, although formed of several carpellary leaves. This is caused by the leaves not being turned in towards the axis, but merely united at their edges, or only slightly inflexed. The placentae are then said to be parietal. Occasionally they are diffused over the whole face of the dissepiments.

259. A one-celled ovary may also be formed out of several carpels by the obliteration of the dissepiments.



a. a leaf; b. leaf rolled up, preparatory to its conversion into a carpel; c. a carpel; d. three carpels approximated but not united; e. the same united at the ovaries, but disunited at the styles; f. these completely united into one ovary (3-celled), one style & one stigma; k. placentae covering the dissepiments; l, m. parietal placentae

260. All dissepiments whose position is at variance with the foregoing laws are spurious

261. Spurious dissepiments derive their origin from various causes & may have either a vertical or horizontal position

262. When horizontal they are called phragmata & are formed by a distension of the lining of the ovary. If vertical, they are either projections from the back of the carpel, or are produced by a turning inward of its margins (h. i.)

263. If the ovary adheres to the sides of the calyx, it is called inferior, & the calyx is said to be superior. If it contracts no adhesion with the calyx it is called superior, & the calyx inferior.



XIV. Ovule.

264. The ovule is a body borne by the placenta & destined to become a seed.

265. It is usually enclosed within an ovary (239); but in Coniferae & Cycadeae it is destitute of any covering, & is exposed naked to the influence of the pollen. The stalk by which it is usually attached to the placenta is called the funiculus or podospetrum.

266. The point of union of the funiculus & the ovule is the base of the latter & the opposite extremity is its apex.

267. The ovule consists of two sacs, one enclosed within the other, & of a nucleus within the sacs. The outer sac is the primine & the inner one the secundine.

268. The primine, secundine, & nucleus are all connected with each other by a continuity of tissue, at some point of their surface.

269. The mouths of the two sacs usually contract into a small common aperture, called the foramen of the ovule, to which the apex of the nucleus is always applied.

270. When the ovule is straight, i.e. where <sup>the</sup> point of union of the two sacs & of the nucleus is at the base, while the foramen is at the opposite end, it is called orthotropous.

271. The relative position of the parts of the ovule is often greatly changed at an early period of its growth, so that the place where the primine, secundine & nucleus are connected, is at the apex, & the foramen is found at the base. Such an ovule is called anatropous.

272. When the ovule is folded upon itself, or curved round, so that the foramen approaches the base it is said to be campulitropous.

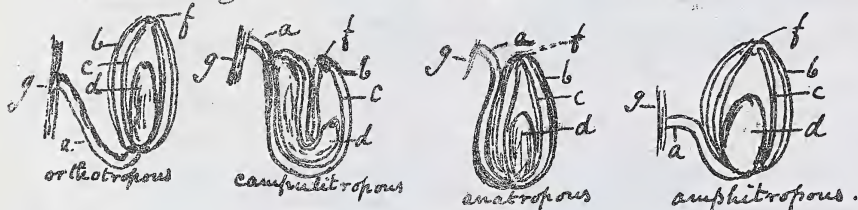
273. In anatropous ovules there is a vascular connection maintained between the base & the apex, by means of a cord or bundle of vessels, called a raphe. It may be considered as a continuation of the funiculus, & adhering to the side of the primine. The expansion of the raphe where it communicates with the sacs & nucleus gives rise to the chalazæ of the seed.

## Ovule

274. When the raphe is very short, so that the funiculus is attached to the middle of the ovule, the foramen being at one end & the base at the other, the ovule is called amphitropous

275. The normal position of the raphe is on that side of the ovule which is next the placenta

276. Within the nucleus (267) is a cavity or bag, called the sac of the amnion, containing a fluid named the liquor amnion, among which the embryo is developed.

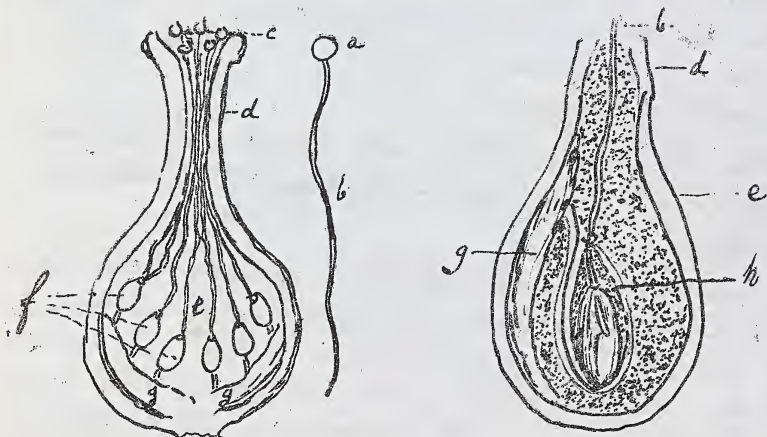


a. funiculus; b. primine; c. secundine; d. nucleus; f. foramen. g. placenta

## XV. Impregnation.

277. Impregnation is effected by contact between the pollen and the stigma

278. The pollen emits a tube of extreme delicacy, which pierces the stigma & style, & passing downwards into the ovary enters the foramen of the ovule; having reached which, it comes into contact with the nucleus.



a. pollen; b. tube. c. stigma; d. style; e. ovary; f. placenta; g. ovules



279. This accomplished, the act of impregnation is over, a new body gradually appears in the sac of the ovule (276) & eventually becomes an embryo.

280. Great numbers of modifications of this phenomenon have been observed, but they all resolve themselves into these facts.

281. In plants, the ovules of which have no pericarpial covering, (Gymnosperms, 265) the pollen falls in the foramen & there acts as if it had come in contact with the stigma.

282. If only one pollen tube enters an ovule, there is but one embryo formed in the seed. But if several pollen tubes pass into the same ovule, there may be several embryos in the same seed.

## XVI. Fruit.

283. The fruit, in the strictest sense of the word, is the pistil arrived at maturity. But the term is also applied to the pistil & floral envelopes taken together, whenever they are all united in one uniform mass. Hence whatever is the structure of the pistil, the same should be the structure of the fruit. But in the course of the advance of the pistil towards maturity, many alterations take place, in consequence of abortion, non-development, obliteration, & union of parts.

284. Sometimes a pistil with several cells, produces a fruit with but one: as in the Oak, Hazel-nut & Cocoa-nut. This arises from obliteration of part of the cells.

285. At other times a pistil of only one or two cells, changes to a fruit having several. This may be caused by the formation of spurious dissepiments, &c.

286. As the fruit is the maturation of the pistil, it ought to indicate upon its surface some traces of a style; this is true in all cases, except in Gymnosperms (281) which have no ovary.

287. Hence the grains of corn, & many other bodies that resemble seeds, having traces of the remains of a style, cannot be seeds, but are minute fruits.

288. That part which was the ovary in the pistil, becomes the pericarp in the fruit.

289. The Pericarp consists of three parts; the outer coating called the Epicarp, the inner lining called the Endocarp, & the intermediate substance named the Sarcocarp.

## Fruit.

290. Sometimes these three parts are all readily distinguished, as in the peach: frequently however they form one uniform substance.

291. The base of the fruit is the part where it is joined to the peduncle. The apex is where the remains of the style are found.

292. The axis of the fruit is often called the columella; the space where two carpels unite is the commisure.

293. All fruits which are mere modifications of a single carpellary leaf ( ) have always a suture corresponding with the junction of the margins (or with the placenta), & often another corresponding with the midrib of the leaf: the former is called the ventral, the latter the dorsal suture.

294. If the pericarp neither splits nor opens when ripe it is said to be indehiscent; if it does split or open it is said to dehisc, or to be dehiscent; of the pieces into which it splits are called the valves.

294. The dehiscence of the pericarp takes place in different ways. If it take place longitudinally or vertically, so that the line of dehiscence corresponds with the junction of the carpels, the dissepiments are divided; the cells remain closed at the back, & the dehiscence is called septicidal.

295. If it take place vertically, so that the line of dehiscence corresponds with the dorsal suture (293), the dissepiments remain united, the cells are opened at their back, & the dehiscence is called loculicidal.

296. When a separation in the pericarp takes place across the cells horizontally, the dehiscence is transverse or circumscissile.



septicidal



loculicidal



transverse

297. If the dehiscence is effected by partial openings of the pericarp, it is said to take place by pores: as in the Poppy.

298. Sometimes the cells remain closed, & separate from the axis (292), as in Umbelliferae.

299. Or the cells open & separate from the axis, which is formed by the cohesion of many placentae, which separate from

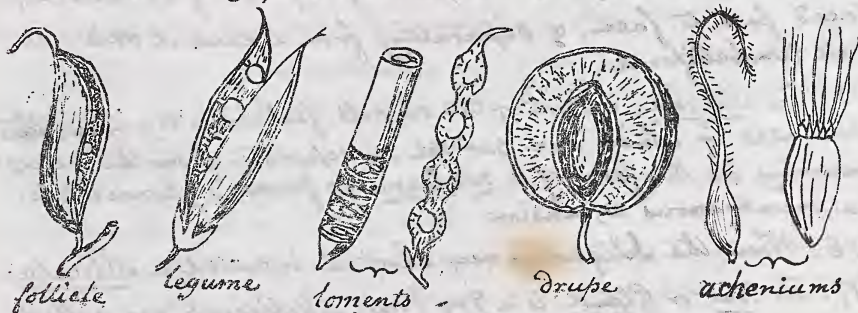


from the dissepiments. At other times the dissepiments cohere at the axis & separate from the valves (294) or back of the carpels.

300. All fruits are either simple or multiple. The former proceed from a single flower. The latter are formed out of several flowers, & consist of masses of inflorescence in a state of adhesion: as in the Fig, Pine Apple & Mulberry

301. Simple fruits are either the maturation of a single carpel (248), or of a pistil formed by the union of several carpels

302. Of fruits formed of a single carpellary leaf, the most important are the following; viz. the Follicle, Legume, Drupe, Achenium, Caryopsis, & Utricle



303. The Follicle is a carpel dehiscing by the ventral suture & having no dorsal suture

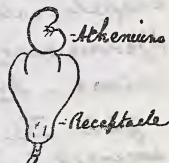
304. The Legume is a carpel having both a ventral & dorsal suture, & dehiscing by both, either, or neither. When it is articulated transversely into several pieces it is called a loment.

305. The Drupe is indehiscent, & its pericarp presents a distinct separation of epicarp, sarcocarp & endocarp.

306. The Achenium is an indehiscent, bony, one-seeded pericarp, which does not adhere to the integument of the seed.

307. Sometimes it bears the remains of a calyx at its summit; or it is drawn out into a beak; or is lengthened into a tail; &c. In the Cashew-nut it is elevated on a large fleshy receptacle

308. The Caryopsis is an indehiscent, membranous, one-seeded pericarp, which adheres firmly to the integument of the seed; as in all the Grass Tribe.



Fruit.

309. The Utricle is a caryopsis, the pericarp of which has no adhesion with the integuments of the seed

310. Of fruit formed of several carpels, the principal are the Capsule, Pyxis, Samara, Cremocarp, Muculanium, Silicqua, Nut or Gland, Berry, Orange, Pome, Pepo, & Balausta

311. The Capsule is a several-celled, dry, dehiscent pericarp.

312. The Pyxis is a capsule that opens transversely. (296)

313. The Samara is a leathery or membranous fruit, of one or more cells, much compressed, & prolonged laterally into wings

314 The Cremocarp is composed of a pair of Schenia, placed face to face, & separating from a central axis; as in all Umbelliferae

315. The Silicqua consists of two carpels fastened together, the placentae of which are parietal, & separate from the valves, remaining in the form of a replum or frame, & connected by a membranous expansion

316. When the Silicqua is very short, it is called a Silicula

317. The Nut or Gland is a dry, bony, indehiscent one-celled fruit, proceeding from a pistil of three cells, & enclosed in an involucre called a Cupule

318. The Berry is a succulent fruit, the seeds of which lose their adhesion when ripe, & lie in a loose pulp.

319. The Orange consists of several membranous carpels, filled with pulpy bags, & surrounded with a thick indehiscent rind

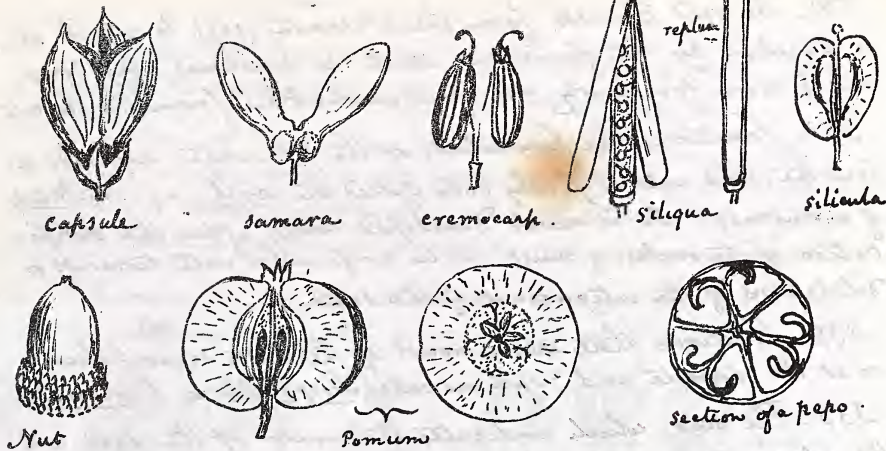
320. The Pome or Apple consists of several united carpels surrounded by the enlarged & fleshy tube of the calyx, with which they firmly cohere

321. "The Pepo is a fleshy inferior fruit, either indehiscent or bursting characteristically irregularly, & consisting of about three carpels, each of which is divided into two cells by its placentiferous margin being so introflexed as to reach the dorsal suture" Arnott.

322. The Balausta is a many-celled fruit, with the seeds arranged in an irregular manner on the backs of the cells, & is formed by more whorls of carpels than one, enclosed within a tough rind; as in the Pomegranate



# Fruit.



323. The most remarkable modifications of multiple or anthocarpous fruits are, the Cone, Pine-apple, & Fig.

324. The Cone is an indurated amentum ( ): as in the Pine-tree. When it is much reduced in size, & its scales firmly cohere, it is called a Galbulus.

325. The Pine-apple is a spike of inferior flowers, which all grow together into a fleshy mass.

326. The Fig is the fleshy, hollow, dilated apex of a peduncle, within which a number of flowers are arranged, each of which contains an achenium.



327. In Dorstenia the dilated apex of the peduncle is flat & open

## XVII. Seed.

328. The seed is the ovule arrived at maturity. It consists of integuments, albumen, & embryo; & is the result of the reciprocal action of the stamens & pistils.

329. In general, seeds are, like ovules, enclosed within a covering arising from a carpellary leaf (244); but Gymnosperms are exceptions. Moreover some ovules rupture their ovary as they grow, & thus become naked seeds: as in Leontice. Others have their ovary only partially closed; as in Mignoneites.

## Seed

330. The seed proceeds from the placenta (247) to which it is attached by the funiculus, which is sometimes very long, but is more frequently not distinguishable from the placenta.

331. Sometimes the funiculus, or the placenta, expands about the seed into a fleshy body called the aril. e.g. the Mace of a nutmeg. It is never developed until after the vivification of the ovule, & must not be confounded with tumours or dilatations of the integument of the seed.

332. Sometimes there are tumours of the testa near <sup>the</sup> hilum, or at the opposite end; such are called Strophioleae or Carunculae.

333. The scar, which indicates the union of the seed with the placenta, is called the hilum or umbilicus.

334. The integuments are collectively called testa, & consist of membranes resulting from the sac of the ovule.

335. Sometimes the testa is covered by a hair-like expansion of its whole surface; as in the Cotton; or these hairs occupy one or both ends, when they constitute what is called the coma. This must not be confounded with pappus (307) which is calyx.

336. The integuments are often expanded into wings, which are either single or several, & appear intended to render the seeds buoyant. Very often they are corky or spongy & not unfrequently consist of spiral cells.

337. The membranes of the seed are called by various names, of which the most frequently used are spERMOTERM or testa for the primine; mesosperm for the secundine; & endopleura for the coat of the nucleus (267).

338. The mouth of the foramen (269) is often distinctly visible, & is named the micropyle.

339. The raphe is in no way connected with impregnation its functions being apparently confined to maintaining a vascular connection between the placenta & the base of the nucleus, for the purpose of nourishing the latter.

340. Where vessels of the raphe expand into the mesosperm the chalaza appears, as a coloured thickening of the integuments.

341. The micropyle always indicates the place in a seed to which the radicle points.

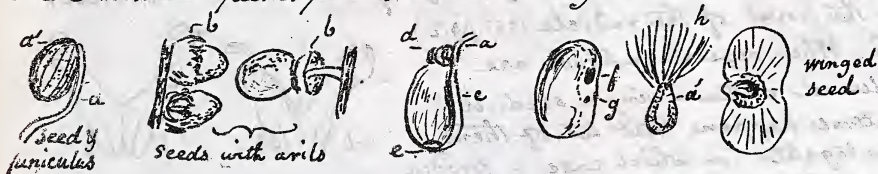
342. And the chalaza is as constant an indication, when it is present, of the situation of the cotyledons.



342. Between the integuments of the embryo of many seeds lies a substance called the albumen or perisperm.

343. It consists of a peculiar matter deposited during the growth of the ovule, among the cellular tissue of the nucleus. It is solid, when uniformly blended with the cellular tissue; of ruminate, when a portion of the tissue remains unconverted.

344. Albumen is usually wholesome, & may be frequently eaten with impunity in the most dangerous tribes.



a. seed; a. funiculus; b. arils; c. raphe; d. strophiole; e. chalaza; f. hilum; g. micropyle; h. coma

345. The organized body that lies within the seed, & for the purpose of protecting & nourishing which the seed was created, is the Embryo. This organ was originally included within the sac of the amnion ( )

346. The latter is usually absorbed or obliterated during the advance of the embryo to maturity, but it sometimes remains surrounding the ripe embryo, in the form of Vitellus; as in Pepper.

347. The embryo consists of the cotyledons, the radicle, the plumule, & the collar



a. cotyledons; b. plumule; c. radicle; d. collar; e. albumen; f. suspensor

Fig. 1. straight embryo; 2. embryo with suspensor; 3. albuminous seed with spiral embryo; 4. helical embryo; 5. vermicular embryo; 6. seed with curved embryo; 7. excentric embryo; 8. embryo with foliaceous cotyledons; 9. convoluted cotyledons; 10. embryo in the axis of albumen (The preceding are all dicotyledonous embryos)

Fig. 11. Fungiform monocotyledonous embryo; 12. Seed of a grass.

## Seeds.

247. The cotyledons represent undeveloped leaves

248. The plumule or geminule is the part that is destined to become the ascending axis ( )

249. The radicle is the rudiment of the descending axis.

250. The collar is the line of separation between the radicle & the cotyledons. The space between the collar & the base of the cotyledons, is called the cauliculus.

251. In some seeds the embryo is furnished with a suspensor from the point of the radicle (347. fig. 2.)

352. When several embryos are produced within a single seed, it sometimes happens that two of them grow together in which case a production analogous to animal dicephalous monsters is formed: as in the Misopeltis. . . . a) Radicle : b) cotyledons.



353. The number of cotyledons varies from one to several. The most common number is either one or two. In the latter they are (with rare exceptions), placed directly opposite each other

354. The direction of the embryo with respect to the seed, will depend on the relation that the integuments, raphe, chalazae, hilum & micropyle, bear to each other.

355. Plants that have but one cotyledon to the seed, or, if two, with the cotyledons alternate with one another, are called Monocotyledonous

356. Plants that have two opposite each other, or a greater number placed in a whorl, are called Dicotyledonous.

357. Plants that have no cotyledons are said to be Acotyledonous. But this term is usually applied only to cellular plants, which, having no stamens & pistils, can produce no proper seeds

358. Arogenous plants ( ) are acotyledonous

360. The plumule is often latent until it is called into action by the germination of the seed. Sometimes it is not distinguishable from the cotyledons: at other times (as in Indian corn) it is highly developed & lies in a furrow of the cotyledons. In the monocotyledonous embryo it frequently happens that the plumule is rolled up in the cotyledon, the margins of which

\* 359. There are a few flowering plants that produce seeds with the cotyledons either consolidated or abortive, & hence appear to be acotyledonous.



grow together, so that the whole embryo forms one uniform mass. (347, fig 12.); but as soon as germination commences, the margins separate.

361. The radicle elongates downward, either directly from the base of the embryo, or after previously rupturing the integument of the base.

362. When the seed is called into action, germination takes place. The juices which were before insipid, immediately afterwards abound in sugar (as in Barley); & growth commences.

363. The growth in the first instance is caused by the absorption & decomposition of water, the oxygen of which combines with the superfluous carbon of the seed, & is expelled in the form of carbonic acid gas.

364. As this phenomenon does not take place in full grown plants, except in the dark ( ), so neither can it occur in seeds, except under the same conditions. Hence an embryo exposed to constant ~~light~~ light, would not germinate at all; & hence the care taken by nature to provide a covering to all embryos, in the form of the integuments of the seed, or of a pericarp.

365. As soon as the necessary proportion of carbon ~~acid~~ is removed from a seed by the expulsion of carbonic, the young plant begins to absorb food, & to grow by the process of assimilation & respiration already described.

### Acrogens, or Flowerless Plants.

366. Many plants are flowerless, or destitute of organs furnished with stamens & pistils; so that they are not increased by seeds. Such are propagated by what are called organs of reproduction, which have no other analogy with the organs of fructification except that both perpetuate the species.

367. The reproductive organs of flowerless plants vary according to the tribes of that division of the vegetable kingdom; & have so little relation to each other, that each principal tribe may be said to have its own peculiar methods of propagation.

368. They all agree in their reproductive parts, or speres, which are analogous to seeds, not germinating from any fixed point, but producing root or stem indifferently from any point of their surface. This germination is therefore vague.

369. The principal tribes are Ferns, Mosses, Lichens, Algæ, & Fungi.

370. Ferns are increased by little bodies called spores, enclosed within cases named thecae or sporangia, which often grow together in clusters or sori, from the veins of the under sides of the leaves, or from beneath the epidermis. The latter, when it encloses the thecae, is termed the indusium.



1. Portion of the frond of a fern, a, a. sori enclosed in an indusium; b. the veins of the frond; c. theca, surrounded with an annulus; d. stipe of the annulus.

2. Portion of a frond, exhibiting sori covered with an indusium. 3. The same; the indusium reniform.

4. Branched stem of a fern, with scaly leaves, & 3-celled thecae.

5. Branch, & spike of fructification; the latter consisting of imbricated scales, under each of which is a theca.

371. The indusium separates from the leaf in various ways, in consequence of the growth of the thecae beneath it.

372. The thecae have frequently a stalk (fig. 1. d.) which passes up one side, & finally curving with their curvature, disappears on the opposite side, this surrounding portion is called the annulus.

373. These thecae may be considered as minute leaves, having the same gyrate mode of development as the ordinary leaves of the tribe; their stalk or stipe is the petiole, the annulus the midrib, & the theca itself the lamina, the edges of which are united. They would therefore be analogous to carpels, if it appeared that they were influenced by the action of any vivifying matter.

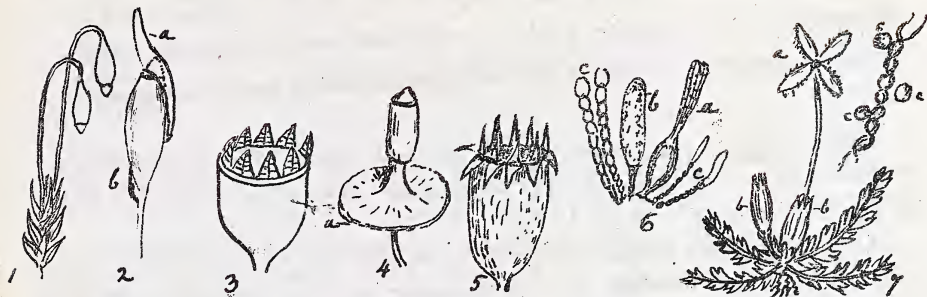
374. Mosses (in which, considered as a tribe we may include the liverworts or Hepaticae) are increased by spores contained within an urn, or theca, or sporangium, placed at the summit of a stalk or seta, <sup>in true mosses</sup> bearing at its apex a kind of loose hood, called a calyptra, & closed by a lid or operculum.

375. The inside of the theca of true mosses has a central axis or columella, & the orifice beneath the operculum is closed by tooth-like



## Acrogens or Flowerless Plants.

procepes, or a membrane, called the peristome.



1, Moss of thecae; nat. size. 2, Theca with calyptra. 3, Theca with single peristome. 4, Theca with apophysis (a) 5 Theca with double peristome. 6. Young theca (a) called pistillidium, with a club-shaped body (b.) called a stamini- idium, & articulated threads, which are, perhaps, abortive stamini- idia. 7. Plant of Jungermannia (ord. Hepaticae); a, 4-valved theca; b, involucre; c, spores.

376. At the base of the theca is sometimes found a tumour, or struma,<sup>fig. 2. b.</sup> or an equal expansion named apophysis (4. a).

377. The number of the teeth of the peristome is always some multiple of four.

378. The calyptra grew originally from the base of the stalk, but when the latter lengthened, the calyptra was torn away & carried up on the top of the theca.

379. The calyptra may be regarded as as a convolute leaf; the operculum, another; the peristome, one or more whorls of minute flat leaves; & the theca itself as the excavated distended apex of the stalk, the cellular substance of which separates in the form of sporules.

380. There are also in mosses certain organs, called anthers by some, which do not appear to be analogous to the bodies so named in flowering plants, of the nature of which has not been demonstrated. They are jointed filaments, stamini- idia or antheridia, containing vibrices (an- imales) lodged in mucous cells, & surround the rudiment of the future theca (fig. b).

381. Lichens are cellular expansions, usually horizontal, but occasionally perpendicular, consisting of a Thallus, or combination of stem & leaves, upon which shields, apothecia, or reproductive or- gans, appear.

382. The shields consist of a margin, enclosing a kernel, (nucleus) in which tubes containing sporules, & called asci, are imbedded



## Aerogens or Flowerless Plants.

Shields vary a little in their nature, & some of the forms have received particular names, such as scutellum (fig. 1, 2 & 3); tuberculum (6); lella (5); a stalk-like elongation of the thallus is called a podetium (4), & a cup-like expansion is called a scypha (4.)

383. Algae are submerged plants, consisting entirely of cellular tissue, & propagated by spores lodged in various parts of the system.

384. The spores either lie freely in the whole substance of the plant, or are collected in particular cells, or occupy jointed filaments, or are placed in spheres, occupying the circumference of expansions of the thallus (381). There are also other modes of multiplication.

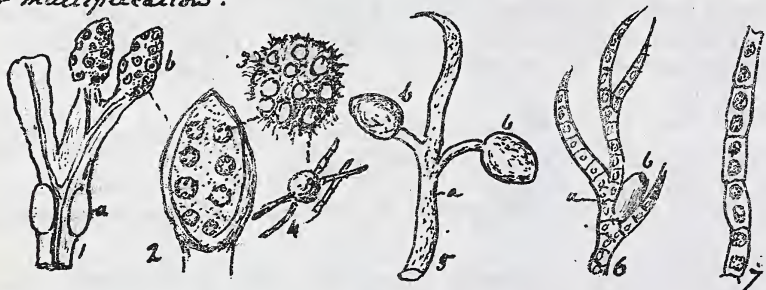


Fig. 1. *Fucus vesiculosus*, a, air bladders, b, reproductive organs, 2. magnified view of Fig. 1, b.; Fig. 3. cluster of spores, Fig. 4. single spore with jointed filaments.

Fig. 5. *Vaucheria geminata*, & spore-cases

Fig. 6. *Huterea*, with two kinds of fructifications, viz. spores lodged in the joint of the frond (a), & collected in ovate receptacles (b).

Fig. 7. A conferva, with green (reproductive) matters collected into globules.

385. Fungi constitute the lowest form of vegetation. They are cellular, but some of the cells contain spiral threads. They are propagated by spores. In the highest forms, two kinds of organs are detected: one cystidia, or conical naked elevations; the other basidia, which are also conical elevations, but they bear spores in definite numbers on their apex.

386. The highest forms of the fungi consist of a stipes, an annulus or collar, a pileus or cap, & an hymenium. Some have sporules enclosed in asci (382). The lowest forms are reduced to a mere peridium or integument containing reproductive matters; or consist of cells placed end to end of containing spores.





## II. Systematical Botany.

387. Systematical Botany is the science of arranging plants in such a manner, that their names may be ascertained, their affinities determined, their true places in a natural system fixed, their sensible properties judged of, & their whole history elucidated with accuracy & certainty. Any thing short of this is not a system, but an artificial scheme.

388. The latter is intended to enable a person to ascertain the name of a plant, & goes no further. But as the name conveys no information by itself: the power thus acquired by artificial schemes is of but little real value, & cannot be considered as anything beyond a very imperfect & elementary mode of investigation.

389. In a natural arrangement, the name of a plant is the least object that is gained. Any investigation of its principles, is of necessity attended with the discovery of the relationship a given plant bears to others; & as plants that are closely akin in structure are also most similar in their sensible properties, it often enables us to judge of the use of an unknown plant whose place is determined in the system, by the ascertained qualities of those species in whose vicinity it takes its place by virtue of its natural affinities.

390. The only artificial schemes in general use are, 1, that of Linnaeus, the characters of which are based on variations in the stamens & pistils; & 2, the Analytical method. The former is now scarcely ever used by scientific botanists.

391. The Analytical method is founded upon the common process of analysis that is unconsciously employed by the human mind. In all cases the mental operation by which one thing is distinguished from another, consists in a continual contrast of characters. For instance, in a mass of individual objects, we distinguish one set which is colored, & another which is colorless; of those that are colored, we distinguish red, black, blue & green; of the red, some are square, others are round; of the round, some are sculptured on the surface, others are even; & so we proceed, analysing the subject by a constant series of contrasts, until we arrive at a point beyond which no analysis can go.

### III. The Natural System.

392. The true Natural System, whenever it shall be discovered, will represent the species, genera, orders, alliances, groupes, sub-clases, & classes of plants, or whatever other divisions may be admitted into it, so arranged, that each plant shall stand next those to which it is more nearly allied in structure than to any others.

393. But the skill of man has not yet attained this end; no system answering to this description has been devised, nor does there appear any probability that it will be discovered till our knowledge of plants is much more advanced.

394. All the so-called natural systems, up to the present day, partly artificial & partly natural. The lower & higher divisions in them are natural, the intermediate divisions are artificial. In other words, the stones of the edifice are hewed & squared, & the general plan is drawn out, but no builder has yet been found with skill to put them together so as to form a consistent whole.

395. But although in theory no system that can properly be called natural has yet been devised, yet for practical purposes many answer to the name, & fulfil the principal conditions required of them.

396. The general & natural orders can alone be considered as agreed upon by botanists, the other divisions are unsettled; & this is the reason why the natural orders seldom follow in the same ~~order~~ manner in the arrangements of two different botanists.

397. There is no such thing as an arrangement which shall express the natural ~~arrangements~~ relations of plants in a consecutive series. It seems to be generally admitted that each species is allied to many others in different degrees, & that such relationship is best expressed by rays (the affinities) proceeding from a common centre (the species). In like manner, in studying the mutual relationship of the several parts of the vegetable kingdom, the same form of distribution is constant, <sup>as it were,</sup> genera & orders being found to be ~~the~~ <sup>as it were,</sup> centres of spheres, whose surface is only defined by the points where the last traces of affinity disappear.

398. But although the mind may conceive of such a distribution of organized beings, it is impossible to present it to the eye, and



all attempts at effecting that object have failed.

399. The fundamental principle of systematic botany is, that those plants should be stationed in company with each other which have the greatest degree of affinity; & that those should be placed most remotely which have the smallest degree of affinity.

400. Affinity is an accordance in all essential characters.

401. From this is distinguished analogy, which is a conformity in one or two characters only.

402. What we call the characters of plants are merely the signs by which we judge of affinity; & all the groups into which plants are thrown are in one sense artificial, inasmuch as nature recognises no such groups. Nevertheless, consisting in all cases of species closely allied in nature, they are in another sense natural.

403. But as the classes, subclasses, groups, alliances, natural orders & genera of botanists have no real existence in nature, it follows that they have no fixed limits, & consequently that it is impossible to define them with precision.

404. If a system is ever to be devised which shall be natural in all its parts, as far as human means can make it so, this will be brought about by settling the relative value of the characters by which plants are limited, & by introducing uniformity & consistency into the distinctions of the groups, whether inferior, superior, or intermediate.

405. The following propositions seem incontrovertible:-

1. Nothing that is constant can be regarded as unimportant.
2. Every thing constant must be dependent upon, or connected with some essential function. Therefore all constant characters, of whatever nature, require to be taken into account in classifying plants according to their natural affinities.

405. On the other hand, whatever points of structure are variable in the same species, or in species nearly allied to each other, or in neighboring genera, are unessential to the vital functions, & should be set aside, or be regarded as of comparative unimportance.

406. Those peculiarities of structure, which are connected

Natural System.

with the manner in which a plant is developed are physiological.

407. Those peculiarities of structure which are connected with the manner in which parts are arranged are structural.

408. Physiological characters are of two kinds; 1, those which are connected with the mode of growth (or organs of vegetation); & 2, those which regulate reproduction (or organs of fructification).

409. Physiological characters are of greater importance in regulating the natural classification of plants than structural.

410. All modifications of either are respectively important, in proportion to their connection with the phenomena of life.

411. The internal or anatomical structures of the axis & of the foliage is of more importance than any other character; because these are the circumstances which essentially regulate the functions of growth, & the very existence of the individual.

412. The next in order is the internal structure of the seed, by which the species must be multiplied.

413. Next to this must be taken the structure of the organs of fructification, by whose united action the seed is called into being; for without some certain, uniform, & invariable action on their part, the race of a plant must become extinct.

414. On the other hand the floral envelopes ( ), the number, form, & condition, the presence or absence, the regularity or irregularity, seem to be unconnected with functions of a high order, & to be designed rather for the decorations of plants, or for the purpose of giving variety to the aspect of the vegetable world; they are consequently of low & doubtful value, except for specific distinctions.

415. The consolidation of parts of fructification is a circumstance but little attended to in a general point of view, except in respect to the corolla; but it probably deserves to be regarded with great attention.

416. If consolidation, is on the one hand, to be regarded as a character of high importance, so must disunion also be so considered on the other.

417. Beyond these points no fixed rules have been discovered for judging of the value of the subordinate peculiarities of plants; & the employment of secondary characters is in a great degree arbitrary.



# Natural System.

## IV. The Natural System of De Candolle.

Many natural systems have been proposed by different botanists. Ray, Linnaeus, Jussieu, De Candolle, Bartling, Endlicher, Lindley & others have each had their own system; & perhaps the best character that can be given of them is, that while they are all far from the truth, each has some merits which the others want.

The system of De Candolle, however, having been taken as the basis of the most perfect enumerations of plants that has ever been made, we shall give the characters of his principal divisions, & arrange our list of medicinal plants according to the natural orders as he has disposed them.

Plants are either furnished with visible flowers, or they are multiplied in some other way. Hence the two great divisions, of Flowering (Phaenogamous or Phanerogamous); & Flowerless (Cryptogamous).

Flowering plants are either Exogens ( ) or Endogens ( ), with which Dicotyledons ( ) & Monocotyledons ( ) respectively correspond.

Flowerless plants are Altheogamous (Semivascular), that is furnished with stomates & vascular tissue; or they are Amphigamous (Cellular), that is, destitute of stomates and entirely ~~vascular~~ cellular.

Hence arise four Classes

### 1. Flowering Plants.

Class 1. Exogens or Dicotyledons

Class 2. Endogens or Monocotyledons

### II. Flowerless Plants.

Class 3. Altheogamous or Semivascular

Class 4. Amphigamous or Cellular.

The principal subdivisions of these classes will be found in the following list of medicinal plants.

Medical Botany.

The following list embraces the more important plants from which materials employed medicinally or for food, are obtained. Those that are natives of North America are underscored: thus, Baptisia tinctoria. If the plant is merely naturalized in North America, the mark § is added: thus, Conium maculatum §.

The names of the most valuable plants are written in larger letters than usual: thus Papaver somniferum; while those of doubtful or feeble powers are indicated by this mark (†) e.g. Scutellaria lateriflora †

The following abbreviations are used for countries; viz.:-  
Eu. for Europe; Af. Africa; As. Asia; E. I. East Indies;  
W. I. West Indies; S. A. South America; N. H. New Holland;  
C. G. H. Cape of Good Hope.

The generic names have numbers prefixed to them, & are underscored with a double line: the English generic name (when there is any) follows immediately after.

Class I. Exogenae. ( )Subclass I. Thalamiflorae.

Flowers furnished with a calyx & corolla. Petals distinct.  
Stamens hypogynous ( ).

Order Ranunculaceae. The Crow-foot Tribe.

1. Ranunculus (Crow-foot). nearly all the species of this extensive genus possess powerfully acrid, rubefacient & vesicatory properties. The principal species used are R. bulbosus †, Sceleratus †, acris †, Flammula, repens, & abortivus. The juice of R. Thora is used to poison weapons.
2. Adonis (Pheasant's eye) vernalis, Eu. Emmenagogue.
3. Thlaspi vesicatoria, C. G. H. Leaves used as vesicant.
4. Hydrastis Canadensis (Yellow-root). Rhizome yellow; a tonic bitter.
5. Anemone (Wind-flower) Pulsatilla, Eu. Extract used in tænia, hortensis, Eu., coronaria, Eu. & nemorosa, Eu. are all highly acrid.
6. Hepatica (Liver-wort) triloba, Eu. † used as a remedy for hemorrhage.
7. Clematis (Virgin's bower) erecta, Eu., Flammula, Eu., Vitalba, Eu., are acrid & vesicant. C. Virginiana is a phloetic & diuretic.



## Medical Botany.

8. Helleborus (Hellebore) niger, Eu.; viridis, Eu.; foetidus, Eu.: all narcotic & acrid. Used as hydrogogue cathartics, & emmenagogue. The last is also employed as a remedy against ascarides.

9. Coptis trifolia. Its rhizoma is a tonic bitter without astringency.

10. Argemone sativa, Eu. Seeds aromatic & carminative; somewhat acrid.

11. Delphinium (Larkspur) consolida, Eu. acrid; seeds emetics.

D. Staphisagria, Eu. Seeds very poisonous, emetic, drastic, used for scabies, & for killing lice.

12. Aconitum (Wolfsbane) lycoctonum, Anthora & paniculatum are narcotic & acrid; particularly the root. All natives of Europe.

A. Napellus, Eu. more powerful than the preceding. The tincture of the leaves useful in rheumatic & neuralgic affections. It blunts the sense of pain.

A. uncinatum, & A. reclinatum (n.sp. Gray in Sib. Jour.) probably active.

13. Actaea (Baneberry) spicata, Eu. Fruit poisonous. Root antispasmodic expectorant & astringent.

A. alba (White Cohosh) & rubra (Red Cohosh) The roots are mild astringents & tonics.

14. Cimicifuga (Rugbane) racemosa (Black snake root) Root tonic & astringent; also diaphoretic & expectorant.

15. Xanthorrhiza apiifolia (Yellowroot). Root, wood, & bark intensely bitter & tonic.

16. Paeonia officinalis & corallina, Eu.: Seeds emetic & cathartic.

### Order Anonaceae. The Custard apple Tribe.

17. Xylopia longifolia, S.A. Fruit a valuable febrifuge.

X. glabra, W.I. Wood bark & berries warm & bitter.

18. Habelia Althiopica (Piper Althiopicum of Commerce) af. Spicy.

H. aromatica, Guiana. Fruit pungent & aromatic.

19. Monodora myristica, W.I. (American nutmeg) Seeds like nutmegs.

### Order Menispermaceae. The Moonseed Tribe

20. Cocculus Bakis af.; Fibraurea, China. Roots diuretic & very bitter.

C. cinerascens, S.A. a Brazilian remedy for fever.

C. crispus, E.I. Whole plant bitter: used in intermittents.

C. cordifolius, E.I. Root a celebrated tonic in India.

C. palmatus (Kalumb or Calumba - vulgarly Columbo) af. Tonic.

21. Pereiria medica, Caylen. Root tonic & stomachic.

22. Anamirta Cocculus, E.I. The seeds are Cocculus Indicus of Commerce; a well known poisonous drug.

23. Menispermum Canadense. Root tonic & diuretic.

24. Abuta rufescens, Guiana. The root is White Pareira Brava a tonic. Other genera & species of this order are more or less bitter & tonic.

Order Berberaceae. The Barberry Tribe.

25. Berberis vulgaris § Eu (Common Barberry) Fruit acid: bark astringent.  
 26. Leontice thalictroides (Blue Cohosh. Papoose-root). Bitter diuretic.  
 The seeds when roasted are a pretty good substitute for coffee.  
 27. Jeffersonia diphylla (Twin-leaf). Stimulant, diaphoretic, antispasmodic.  
 28. Podophyllum peltatum (May apple). Hydragogue cathartic.

Order Nymphaeaceae. The Water-lily Tribe.

- The large rootstocks of this order are astringent & slightly narcotic.  
 The N. American genera & species are chiefly the following: viz.  
 29. Nuphar lutea, advena, & sagittifolia. (Yellow Pond-lily)  
 30. Nymphaea odorata (White Pond-lily).

Order Nelumbiaceae. The Lotus Tribe.

31. Nelumbium luteum. Rhizoma farinaceous: the nuts also, edible.

Order Dilleniaceae.

Plants of this order are generally astringent: none are yet official.

Order Magnoliaceae. The Magnolia Tribe.

32. Magnolia glauca (Swamp magnolia). Bark bitter & aromatic.  
M. acuminata. Gently stimulant, tonic & aromatic.  
 33. Liriodendron tulipifera (Tulip-tree) Bark stimulating tonic.

Order Winteraceae. The Winter's-Bark Tribe.

34. Illicium Flindianum. Seeds aromatic stimulant.  
 35. Drimys Winteri, S.A. (Winter's bark) Aromatic tonic.

Order Cruciferae. The Cabbage Tribe.

A very large order. All the species are harmless: most of them are more or less pungent & antiscorbutic. The pungency is volatile.

36. Cochlearia officinalis (Scour grass) Eu  
C. Armoracia, Eu. (Horse-radish)  
 37. Cardamine pratensis, Eu. (Cuckoo-flower). Stimulant & diuretic.  
 38. Sinapis nigra § Eu. (Black mustard) Seeds acid, stimulating & bitter.  
 Oil purgative; rubefacient; vesicant.  
 39. S. alba § Eu. (White mustard) Seeds acid: stimulating cathartic.  
 40. Raphanus sativus § Eu. (Radish) Seeds emetic: roots diuretic.

Order Capparidaceae. The Caper Tribe.

41. Capparis spinosa Eu The young flower buds are the capers of the shops.



Order Papaveraceae. The Poppy Tribe.

42. Papaver somniferum. Eu. (medicinal poppy) The dried juice of the half-ripe capsules, is opium. The oil of the seeds is bland & inactive.
43. Chelidonium majus & Eu. Juice an acid poison: Cures warts.

Order Cistaceae. The Rock-rose Tribe.

44. Cistus creticus, Eu. Produces the gum-resin Ladanum; a stimulant & emmenagogue.

Order Violaceae. The Violet Tribe.

The roots of most are emetic

45. Sonchium oleraceum & Boya, of Brazil produce roots that are often substituted for true Speacacanth. Other species are powerful emetics & purgatives.

Order Polygalaceae. The Milkwort Tribe.

46. Polygala senega (Seneca Snake-root). Root stimulating expectorant & diuretic.

Order Malvaceae. The Mallow Tribe.

47. Althaea officinalis & Eu. (Marsh-mallows), mucilaginous & emollient. Similar properties exist in most of this tribe.
48. Gossypium herbaceum Engl. & A. The wool of the seeds is cotton.

Order Tiliaceae. The Linden Tribe.

49. Tilia americana (Linden or Bass wood). The bark emollient & mucilag.

Order Dipterocarpaceae.

50. Dryobalanops aromatica, Sumatra & Borneo. Yields Sumatra camphor.

Order Aurantiaceae. The Orange Tribe.

- The juice of the fruit usually abounds in citric acid, & sometimes in sugar.
51. Citrus aurantium yields the Sweet Orange; C. Bigaradia the Bitter Orange; C. Limetta is the bergamot; C. Limonium yields the Lemon.

Order Hypericaceae. The St John'swort Tribe.

52. Hypericum perforatum & Eu. (Common St. John'swort). Leaves astringent.

Order Guttiferae.

53. Hebradendron Cambogioides (Ceylon Yields Gamboge (See Graham & Christison in Compan. to Bot. Mag. 2. pp. 193 & 233))
54. Calophyllum Calaba, S. I. Yields the resinous juice Tacamahaca. The general properties of the order are acid & purgative.

Order Aceraceae. The Maple Tribe.

55. Acer saccharinum (Sugar maple) & A. nigrum (Black maple) yield maple sugar. The bark of A. rubrum is a good astringent.

Order Ternstramiaceae. The Tea Tribe.

(This should have been placed after Rurantiaceae)

56. Thea viridis yields ~~Black~~ Green tea & T. Bohea, Black tea. Both from China

Order Cedrelaceae. The Mahogany Tribe.

57. Swietenia Mahoganis, W.I. (Mahogany tree) The bark is a tonic

58. Saymida febrifuga, S.I. Bark tonic & astringent

59. Cedrela Toona, S.I. Bark a powerful astringent of tonic -- not bitter.

Order Meliaceae. The Pride of India Tribe.

60. Melia Azedarach, S.I. Root bitter & nauseous; anthelmintic

61. Guarea Aubletia & trichilioides, W.I. bark purgative & emetic

Order Vitaceae. The Vine Tribe.

62. Vitis vinifera (Grape vine) As. Fruit cooling & antiseptic; diuretic & laxative in large quantities; Raisins more laxative than the fresh fruit

The N. Amer. species produce wine, but not raisins

63. Ampelopsis quinquefolia (Virginian creeper). Expectovent

Order Geraniaceae. The Geranium Tribe.

64. Geranium maculatum. Root a powerful astringent

Order Balsaminaceae. The Balsam Tribe.

65. Impatiens pallida & fulva. Emetic, cathartic & diuretic

Order Linaceae. The Flax Tribe

66. Linum usitatissimum, Eu. as. The seeds demulcent, & for cataplasms.

Order Oxalidaceae. The Wood-sorrel Tribe.

67. Oxalis - a numerous genus - all acid; containing bitartrate of potassa

Order Rutaceae. The Rue Tribe.

Most of the species contain powerfully scented oils.

68. Ruta graveolens (Common Rue) Eu. anthelmintic, sudorific & emmenag.

69. Cuscutaria febrifuga, S.A. (Angostura bark) Valuable febrifuge

70. Barosma crenulata, serratifolia & crenata, C.G.H. (Diosma, Bucku)

Leaves an excellent aromatic, stomachic & efficacious diuretic



Order Xanthoxylaceae.

71. Xanthoxylum Clava Herculis, W.I. Bark sudorific & expectant.  
X. americanum & Carolinianum (both called Prickly Ash). Stimulant, Diaphoretic & subaromatic. Used in chronic rheumatism.  
 Other species, of similar powers, grows in Asia.  
 72. Ptelea trifoliata (Shrubby trefoil) Fruit a substitute for hops.  
 73. Brucea antidysenterica, Abyssinia. Bark tonic & astringent

Order Zygophyllaceae.

74. Guaiacum officinale, W.I. (Lignum vitae) Yields a stim. gum-resin.

Order. Simarubaceae. The Quassia Tribe

75. Quassia amara, E.I. Wood an intense pure bitter  
 76 Simaruba amara, W.I. Bark of the root a powerful bitter  
 77. Pieraena excelsa, W.I. The wood yields most of the Quassia chips

Subclass II. Calyciflorae

Flowers furnished with a calyx & corolla. Petals distinct.  
 Stamens perigynous ( )

Order Celastraceae

78. Celastrus scandens (False Bittersweet) Narcotic, stimulant

Order Rhamnaceae. The Buck-thorn Tribe.

79. Rhamnus catharticus & Eu (Common buckthorn), Frangula &c. The berries active cathartics  
 80. Zizyphus Enoplia E.I. Fruit acid.  
Z. Jujuba & vulgaris, E.I. The fruit is Jujube  
 81 Ceanothus Americanus, (N. Jersey Tea). Bark & twigs astringent

Order Anacardiaceae. The Cashew Tribe.

82. Rhus (Sumac) Toxicodendron, vernicefera, Japan & venenata. are acrid poisons to many persons. The berries of R. glabrum & typhinum yield limonate of lime, an agreeable acid.  
 83. Pistacia vera, S. Eu. Fruit emollient. Produces Pistacia nuts  
P. terebinthus, S. Eu. Yields Cyprus turpentine  
P. Lentiscus, S. Eu. Yields the resin called Mastic.  
 84. Anacardium occidentale, E & W.I. The fruit is the Cashew nut the coat of which contains a caustic oil. The fleshy peduncle is edible.

Order Leguminosae. The Bean Tribe

85. Baptisia tinctoria, Cathartick, emetic & subastringent. An ointment made of the bark of the root useful in some forms of Herpes.
86. Cytisus Laburnum, Eu. (Common Laburnum) Seeds narcotico-acrid  
C. scoparius, Eu. (Common Broom) Shoots diuretic & cath. seeds emetic.
87. Indigofera (Indigo). The common indigo is produced by I. tinctoria, &c. The blue dye of this & other species is a dangerous poison.
88. Glycyrrhiza glabra, Eu. (Licquorice). Roots sweet, tonic, demulcent. The solid extract is common licquorice.
89. Fiscidia Erythrina, W. I. (Jamaica Dogwood) Bark narcotic & diaphoretic
90. Colutea arborescens, Eu. (Bladder Senna) leaves purg., used for adulterating Senna
91. Astragalus verus, Persia. Yields most of the Tragacanth of commerce  
A. Tragacantha DeCandolle says produces no Tragacanth.
92. Alhagi Maurorum, Egypt, Ab. (Camel's Thorn) Produces a kind of manna
93. Ervum Ervilia, Eu. (Bitter Vetch). Seeds poisonous.
94. Abrus precatorius (Wild Licquorice) E. I. & W. I. Infusion of extract of the root & leaves. used instead of Licquorice
95. Mucuna pruriens, W. I. (Cowitch) The medicinal article consists of the strong stinging hairs of the pods.
96. M. Prurita, E. I. Resembles the preceding.
97. Pterocarpus erinaceus Af. Produces Kino, a powerful astringent  
P. Maroufium, E. I. also produces a good resin like kino  
P. Draco, W. I. The dried resinous juice formerly called Dragon's Blood.  
P. Santalinus, E. I. produces Red Sandal Wood.
98. Cassia elongata, India. Produces the finest (Tinnevely) Senna  
C. acutifolia, Egypt. Produces Alexandrian Senna  
C. lanceolata, Arabia. True Senna of Mecca  
C. obovata, Af. Ab. Produces Black-leaved Senna, an inferior kind.  
C. Marilandica, (American Senna) Leaves an excellent purgative
99. Cathartocarpus Fistula, E. I. & W. I. Produces Cassia pods, the pulp between the seeds of which, is a gentle laxative.
100. Haematoxylon Campeachianum, W. I. Produces Logwood
101. Tamarindus Indica, E. & W. I. Produces Tamarinds.
102. Hymenaea W. I. & S. A. The resin (a kind of gopal) tonic & subastring. Fruit purgative; bark anthelmintic
103. Acacia Catechu E. I. Yields Bengal Catechu: astringent.  
A. Arabica, E. I. & Arabia. The bark yields Gum Arabic.

Order Saxifragaceae. The Saxifrage Tribe

104. Heuchera Americana (Plum-root) A powerful astringent.



Order Rosaceae. The Rose Tribe.

105. Geum (Avena) rivale, Eu., Stomachic. Useful in Diarrhoea  
G. urbanum, Eu., G. virginianum, & other species - astringent.
106. Agrimonia Eupatoria Eu. (Common Agrimony) astringent; anthelmintic.
107. Rubus villosus (Blackberry) Bark of the root a valuable astringent  
R. Canadensis (Low Blackberry) Tonic & astringent
108. Rosa (Rose) centifolia, Caucasus. Petals used for making Rose water.  
 " R. Canina (Dog-rose) Eu. This & allied species used for making con-serve of Roses. The pulp of the fruit is employed.  
 " R. gallica, Eu. Petals astringent & tonic.
109. Gillenia trifoliata & stipulacea. Both are called American Ipecac.  
 The root a mild, but efficient emetic, & occasionally cathartic.
110. Spiraea. The species nearly all bitter astringents & Tonics.
111. Amygdalus communis, Barbary, Syria &c. Produces sweet, & bitter almonds.  
 The fruit of the latter yields prussic acid.  
A. Persica, (Peach) The flowers & kernels contain prussic acid.
112. Cerasus Lauro-cerasus (Common Laurel) Eu., Persia. The oil of distilled water contain a deadly poison
113. C. Caroliniana. properties similar to the preceding.  
C. serotina (Wild Cherry) Bark anodyne. tonic of febrifuge.
113. Pyrus Aucuparia, Eu. (Mountain Ash) Flowers bark & root poisonous.
114. Cydonia vulgaris, Eu. (Quince) Seeds demulcent.
115. Sanguisorba Canadensis (Burnet Saxifrage) subastringent & tonic.

Order Amyridaceae.

116. Myrospermum Peruiferum S.A. Yields Balsam of Peru.  
M. Toluiferum, S.A. Yields Balsam of Tolu.
117. Copaifera. Balsam of Copaima is produced by different (S.A.) species of this genus.

Order Myrtaceae. The Myrtle Tribe.

118. Melaleuca Cajuputi, E.I. Produces Cajuputi Oil. Irritating & stimulating
119. Punica Granatum, Ad. (Pomegranate) Bark of the root a powerful anthelmintic. Flowers & rind of the fruit tonic & astringent
120. Myrtus communis, Eu. (Common Myrtle) Aromatic & astringent
121. Caryophyllus aromaticus, Molucca Ids. The dried flower-buds, or Cloves, are stimulant & carminative: these yield oil of cloves.
122. Eugenia Pimenta, W.I. The unripe fruit is Allospice. Oily & irritating.  
E. acris, W.I. (Wild Clove) Fruit resembles the preceding.
123. Eucalyptus resinifera, N.H. Bark astringent yielding a sort of Kino.

Order Cucurbitaceae. The Gourd Tribe.

124. Lagenaria vulgaris (Bottle gourd) Fruit poisonous.

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125. Cucumis Colocynthis, As., af. The unripe fruit yields Colocynthis.  
 126. Luffa amara, E.I. Fruit violently cathartic & emetic.  
 127. Bryonia dioica, Eu. (Bryony) Root active & purgative.  
 128. Momordica Elaterium, Eu. The fruit affords Elaterium.  
 129. Melothria pendula, I.A. Extremely drastic.

Order Cactaceae. The Indian Fig Tribe.

- 130 The fruit of several species is eaten under the name of Indian Figs.

Order Grossulaceae. The Gooseberry Tribe.

131. Ribes rubrum produces Red Currants.  
R. grossularia is the Gooseberry bush. Native of Europe.  
R. nigrum, is the Black Currant.

Order Hamamelaceae. The Witch Hazel Tribe.

132. Hamamelis Virginica, W. Astringent of Vegetables.

Order Araliaceae. The Ginseng Tribe.

133. Aralia racemosa (American spikenard) Aromatic, stem, & alterative.  
A. nudicaulis (Wild Sassafras) Gently stimulant & alterative.  
 134 Panax quinquifolium (Ginseng) a very mild aromatic stimulant &

Order Cornaceae. The Dogwood Tribe.

135. Cornus (Dogwood) florida (Common Dogwood) Valuable tonic & astringent.  
C. sericea (Swamp Dogwood) an excellent tonic; useful in intermittent.  
C. circinata, astringent & C. stolonifera - tonic & astringent.

Order Umbelliferae. The Umbelliferous Tribe.

136. Cicuta maculata (American water hemlock) A virulent narcotic poison.  
C. viriosa, Eu. (Water horebane) A virulent poison - effect like those of prussic acid.  
 137. Apium graveolens, Eu. (Celery) Poisonous if acid when wild, & in wet ground, a pleasant salad when cultivated in dry ground.  
Petroselinum sativum, Eu. (Parsley) Stimulating salad.  
 138. Carum Carui, Eu. (Caraway) Carminative.  
 139. Ananthes crocata, Eu. (Dead tongue) A dangerous poison.  
O. Phellandrium, Eu. (Water dropwort) Less poisonous than the preceding.  
 140. Rhitha Cynapiens S.Eu. (Foot, hardley) The leaves a narcotic poison.  
 141. Foeniculum vulgare, Eu. (Common Fennel) The fruit yields oil of Wild Fennel.  
F. dulce, Eu. (Sweet Fennel). Yields oil of Sweet Fennel.



142. Archangelica atropurpurea (Common Angelica) Pleasant aromatic tonic.  
A. officinalis, Eu. Root fragrant, pungent & somewhat bitter.
143. Ligusticum actaeifolium (Rondo. "Angelico") Root aromatic & stomachic.
144. Opoponax chironum, Eu. & As. The dried milky juice of the root is Opoponax.
145. Ferula Asafoetida, Persia, &c. The foetid gum-resin Asafoetida is obtained from the roots.
- F. orientalis, As. Supposed to yield the gum-resin Ammoniacum. but Prof. D. Don says it is produced by the Dorema ammoniacum of Persia. See Linm. trans. xvi. 601.
146. Pseudanemum officinale, Eu. (Sulphur wort.) Juice of the root antispas. & diuretic.
147. Imperatoria Ostruthium, Eu. (Master wort.) Root acrid: a masticatory.
148. Anethum gravesolens (Dill) Eu., As., &c. Fruit carminative & stimulant.
149. Heracleum (Cnapagnum) spondylium, Eu. & H. lanatum. Like the preceding
150. Galbanum officinale, Syria. Yields the gum-resin Galbanum. See Don, l.c.
151. Cuminum Cuminum, Af. (Cumin.) Carminative - but rather disagreeable.
152. Daucus Carota & Eu. (Common Carrot.) Fruit carminative & diuretic: root used for poultices.
153. Anthriscus cerefolium, Eu. (Chervil.) Roots eatable
154. Conium (Hemlock, or Poison Hemlock.) Narcotic-acrid; a violent poison  
 The common species is C. maculatum & Eu.
155. Smyrniolum (Alexanders) Olusatrum, Eu. & other species, carminative.
156. Coriandrum sativum, Eu. (Coriander) The fruit aromatic & carminative.

Subclass III. Corolliflorae. Fl. with calyx & corolla. Petals united, bearing the stamens.

Order Caprifoliaceae. The Woodbine Tribe.

157. Triosteum perfoliatum (Fever-root) Bark of the root emetic & cathartic.
158. Sambucus (Elder) ebulus, Eu. (Common European Elder) Roots cathartic.
- S. nigra, Eu. Bark purgative & emetic: flowers diaphoretic: berries cold, cooling, laxative, diuretic - known by the name of Elder berries.
- S. canadensis. Resembles S. nigra:

Order Cinchonaceae or Rubiaceae.

159. Cinchona. Many species of this genus (commonly called the Peruvian bark tree) grow in Peru, Carthagenas & other parts of S. America - but some of them are, as yet, only known by their commercial names. The following is Lindley's Classification of the principal kinds known in Great Britain.

	Crown or Loxa Bark.	- - -	<u>C. condaminea</u> .
Pale Barks.	Silver, Gray, or Huanuco bark.	- - -	<u>C. micrantha</u> .
	Red bark	- - - - -	(not ascertained).
	White Loxa Bark	- - - - -	(not ascertained). [ <u>C. nitida</u> ].
Yellow Barks.	Yellow Bark	- - - - -	<u>C. lanceolata</u> , chiefly; also <u>C. hirsuta</u> ,
	Calisaya	- - - - -	<u>C. lanceolata</u> ?
	Carthagena	- - - - -	<u>C. cordifolia</u> ?
	Cusco bark.	- - - - -	(not ascertained).
Red Bark.	Red Cinchona Bark of Lima	- - -	(not ascertained)
	<u>Cinchona nova</u>	- - - - -	<u>C. magnifolia</u>
Brown Bark.	<u>Huamalies bark</u>	- - - - -	<u>C. purpurea</u>

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160. Exostema Caribaeum, H. B. K. Florida (Seaside Beech) Bark febrif. & Emet.
- This & other species of the genus are bitter & tonic, but contain neither quin. nor Cinch.
161. Pinckneya pubens (Georgia Bark.) Bark febrifugal.
162. Gondaminea corymbosa, S. A. used for adulterating Peruvian Bark.
163. Chiococca (Snowberry) densifolia, Brazil. (Cahinea). A powerful emetic & sudorific: very valuable in dropsy.
164. Coffea arabica, Arabia. The albumen of the seeds is Coffee.
165. Psychotria emetica, S. A. The root is the striated or black, Specacuanha.
166. Cephaelis Specacuanha, S. A. Produces Brazilian Specacuanha.
167. Rubia tinctorum (Madder) said to be tonic, diuretic & emmenag. +

## Order Valerianaceae. The Valerian Tribe.

168. Valeriana (Valerian) officinalis Eu. Root sedative, stim., & narcotic

## Order Compositae.

169. Vernonia noveboracensis. Bitter tonic: employed in intermittent fever
170. Liatris spicata (Butter Snake-root) Stim. diaphoretic & diuretic.  
L. scariosa, squarrosa & other species are also employed as diaphoretics; & some of them are popular remedies against the bite of a rattlesnake  
L. odoratissima exhales a powerful odor of Vanilla
171. Eupatorium perfoliatum (Boneseet) A valuable tonic stimulant
172. Mikania Guaco, S. A. Remedy for the bite of poisonous snakes.
173. Lupinus latifolius (Collisfoot) Slightly tonic bitter.
174. Erigeron philadelphicus (Horseweed) Tonic.
175. E. Canadense (Horseweed) A bitter tonic.
176. Solidago (Golden rod) odora. Yields a fragrant stimulant & diaphoretic oil, which resembles both anise & Sassafras. The leaves used as a substitute for tea.
177. Inula Helenium S. Eu. (Elecampane) Tonic, diuretic, diaphoret.
178. Anthemis nobilis, Eu. Produces Chamonilla flowers. Tonic, stim. emet.
179. Marula Cotula S. Eu. (Mayweed) Fitted for acid: emet. & diaphoret.
180. Anacyclus Pyrethrum, Af., As. (Pellitory of Spain) Root hot & acid.
181. Pharmacia vulgaris, Eu. (Incepswort). Plant pungent, sternutatory
182. Pyrethrum Parthianum, Eu. (Feverfew) Bitter, tonic, antispasmodic.
183. Artemisia (Mugwort) (Wormwood) Most of the species of this numerous genus are bitter & more or less aromatic plants.  
A. Absinthium, Eu. (Common Wormwood). a powerful bitter & stomachic.  
A. Abrotanum, Eu. (Southernwood) Anthelmintic  
A. Moxa, China. The woolly leaves furnish Moxa.  
A. Dracunculus, Russia (Tarragon) Leaves pungent of stimulating: used as a pickle, & to flavor vinegar.
184. Tanacetum (Tansy) vulgare S. Eu. (Common Tansy) Bitter & cordial
185. Calendula officinalis, Eu. (Pennygold) Anthelmintic: also used to adulterate saffron.



184. Lappa (Burdock) minor. & Eu Root tonic, aperient, sudorific & diuret.  
 185. Gnaphalium (Cudweed) polyccephalum (Life everlasting; Balsam.)  
 Astringent, balsamic & expectorant.  
 186. Helenium autumnale (American sneezewort) Bitter & erethine.  
 187. Lactuca virosa, Eu (Wild Lettuce) Narcotic.  
L. sativa (Eu. Common Lettuce) Produces Lactucarium.  
L. elongata (American Wild Lettuce) Anodyne, diaph. & diuretic.  
 188. Taraxacum Dens leonis, Eu. (Dandelion) Tonic, diuretic & aperient.  
 189. Cichorium Intybus & Eu. (Wild Succory) Root tonic & aperient. Also used as a substitute for coffee.

### Order Lobeliaceae. The Lobelia Tribe.

190. Lobelia inflata (Indian tobacco. "Low belia") The sheet anchor of the steam doctors: emetic, sudorific & expectorant.  
 " L. siphilitica ("High belia") Emetic, cathartic & diuretic.  
 191. Leippobroma longifolia, W. I. Virulent; produces fatal hyperkatharsis

### Order Vaccinaceae. The Whortleberry Tribe.

192. Vaccinium (Whortleberry) The fruit of nearly all the species is sweet & wholesome: & somewhat diuretic: the bark is astringent.  
 193. Oxycoccus vulgaris, Eu., & macrocarpus produce Cranberries.

### Order Ericaceae. The Heath Tribe.

194. Rhododendron maximum (Big Laurel. Rose Bay) Astring. & stimult.  
 " R. chrysanthum, Siberia. A powerful narcotic, producing intoxication.  
 195. Kalmia latifolia (Laurel. Calico bush) powerful narcotic.  
K. angustifolia (Dwarf or sheep-laurel) Like the preceding.  
 196. Azalea pontica, Western Asia. The flowers poison honey.  
 197. Ledum latifolium, Eu. Leaves narcotic.  
 198. Gaultheria (in correctly Gaultheria) procumbens (Spicy Winter green)  
 Stimulating, aromatic, diuretic & emmenagogue.  
 199. Arctostaphylos (or Arbutus) Uva Ursi, Eu. (Bear berry) Astring. & diuret.

### Sub Order Pyrolaceae. The Winter-green Tribe.

200. Chimaphila umbellata (Pipsissewa) Aromatic & diuretic.  
C. maculata (Spotted Winter green). Diuretic & subastringent.

### Order Ebenaceae. The Ebony Tribe.

201. Diospyros Virginiana (Persimmon) Bark astringent & febrifugal: immature fruit excessively astringent.

### Order Styracaceae. The Storax Tribe.

202. Styrax officinale, Western Asia. Yields the balsamic resin Storax.  
S. Benzoin, Eastern Asia. Yields the balsamic resin Benzoin.

Order Aquifoliaceae. The Holly Tribe.

203. Ilex (Holly) Aquifolium (European Holly) Eu. Bark tonic.  
I. opaca (American Holly) virtues probably similar to the preceding  
I. vomitoria. A mild emetic.
204. Prinos verticillatus (Winter Berry - Black Alder) Bark tonic; berries emet.

Order Sapotaceae

205. Balgia longifolia, E.I. Oil of the fruit - used to cure itch as well as to burn in lamps: infusion of the leaves, bark & green fruit used for rheumatism.
206. Achras Sapota, W.I. (Sapodilla Plum) Bark a powerful astringent; seeds diuretic.

Order Oleaceae. The Olive Tribe.

207. Olea Europaea Eu. (Olive) The fruit yields a mild demulcent oil called Olive oil. The bark is bitter & astringent.
208. Ornus Europaea (Flowering ash) The branches yield Manna.  
O. rotundifolia, Levant. Yields the best Manna.

Order Apocynaceae. The Dogbane Tribe.

209. Cerbera manghas, E.I. Kernels emetic & poisonous; milky juice purgative

C. Thevetia S.A. Bark bitter, cathartic & a powerful febrifuge

210. Strychnos Nux Vomica, E.I. The seeds of this & other species are highly poisonous & known by the name of Nux vomica. Bark bitter & tonic - usually called False Angustura.

S. Colubrina, E.I. The wood is called Signum colubrinum, celebrated in India for curing the bites of venomous serpents.

S. potatorum, E.I. (Clearing nut) The ripe seeds used to make turbid water clear.

S. Ignatia, Philippine Ids. Poisonous; but used as a remedy for cholera

S. toxiifera, Guayana. Yields the celebrated poison Urari or Woorari.

S. pseudoguinaea, Brazil. Bitter & subastringent: valuable febrifuge

211. Willughbeia edulis E.I. The milky juice yields a poor caoutchouc.

212. Alamanda cathartica. Cayenne &c. Leaves a good cathartic.

213. Nerium (Oleander) The root of N. odoratum & Oleander (Eu) poisonous

214. Aspoecyrum (Dogbane) androsæmifolium. Root bitter, emet. & diaph.

A. cannabinum (Indian hemp) similar to the preceding.

215. Urceola elastica, Sumatra. Yields fine caoutchouc



# Medical Botany.

- 216. Wrightia antidysenterica, L. (Congee) Bark astring. & febrifuge
  - 217. Plumera rubra, W. Milk excessively corrosive.
- Other species of Plumera are active cathartics

## Order Asclepiadaceae. The Milk-weed tribe.

- 218. Asclepias tuberosa (Butterfly-weed - Flourishy-root) Root diaphoretic & expectorant: also a mild tonic & stimulant +
- A. syriaca & incarnata: said to be anodyne & expectorant +
- 219. Calotropis gigantea, L. (Mador, Akum, &c.) Root, bark, & inspissated juice, powerful alteratives & purgatives. Valued in the East
- 220. Thliphora asthmatica, L. Root used instead of species in India
- 221. Gynanchum (Dog's-bane) Argel, Egypt. Leaves purgative, & often largely mixed with Alexandrian Senna - to which its frequent griping & other unpleasant effects are attributed.
- 222. Hemidesmus Indicus L. Sarsaparilla of India is chiefly the root of this species

## Order Gentianaceae. The Gentian Tribe

- 223. Gentiana Catesbaei. Root intensely bitter: like G. lutea
- G. lutea, Eu. (Common Gentian) Valuable bitter tonic.
- Most of the species of Gentian are bitter, & several of them are substituted for G. lutea.
- 224. Agastotes Chirapita, L. Gentian of India, a val. tonic bitter.
- 225. Frasera Carolinensis (American Calumba) Root a pure bitter.
- 226. Erythraea Centaurium L. Eu. (Centaury) Bitter like Gentian.
- 227. Sabatia angulata (American Centaury) Tonic & stomachic.
- 228. Mentha trifoliata, Eu. (Buck-bean) a valuable bitter tonic.
- ? 229. Spigelia marilandica (Carolina Pink-root) Purgative, narcotic & anthelmintic.

## Order Convolvulaceae. The Bindweed Tribe.

- 230. Convolvulus (Bindweed) Scammonia, Levant & Greece. The cathartic resin called Scammony is obtained from the roots.
- C. panduratus (Man-of-the-earth) Root cathartic.
- 231. Ipomoea macrocarpa. Root saccharine & farinaceous - not purgative, as was once supposed.
- I. Purga, Mexico. The root is the true Salap.
- I. Orizabensis, Mexico. The root is a kind of Salap.
- I. Cathartica, St. Domingo. Root purg., but apt to prove hypercathartic.
- 232. Calystegia sepium, Eu. Root purgative; milder than Scammony.

Medical Botany.Order Solanaceae. The Potatoe Tribe.

233. Hyoscyamus (Henbane) niger <sup>Eu.</sup> (Common Henbane) Narcotic, antispasmodic.  
 234. Atropa Belladonna, Eu. (Deadly Nightshade) Powerful narcotic.  
 235. Capricum annuum, L. A., E. I. (Cayenne pepper) Hot stimulant  
C. frutescens L. (Goat-pepper) & C. baccatum (Bird-pepper) have similar properties, but are more acrimonious  
 236. Datura Stramonium, Eu. & L. (Thornapple, Stinkweed) Violent narcotic poison. Useful anodyne & sedative.

var. Tatula L. Properties same as the preceding.

237. Physalis (Winter cherry) somnifera, E. I. & Eu. Reputed to be narcotic, diuretic & alexipharmic.

All the species of Physalis seem to be diuretic

238. Solanum nigrum L. (Common nightshade) Narcotic

S. Dulcamara L., A poisonous narcotic - particularly the berries. It is usually called Bittersweet.

S. esculentum, L. (Aubergine) Fruit edible

S. Lycopersium (L.) (Tomato) Fruit gently laxative - & said also, to produce stygialism.

239. Nicotiana (Tobacco) Tabacum, Central America (Common Tobacco) A powerful stimulant narcotic, & emetic. Valuable occasionally as a medicine, but deleterious, & disgusting when employed in any other way.

N. rustica, Eu. Milder than the preceding. Syrian & Turkish Tobacco are prepared from this species

240. Crescentia Cajute, M. I. (Calabash Tree) Fruit pectoral.

Order Scrophulariaceae. The Figwort Tribe.

241. Digitaria (Fox-glove) purpurea, Eu. (Common Foxglove) Diuretic & narcotic.

242. Scrophularia (Figwort) nodosa, Eu. Leaves purg. & emetic.  
S. aquatica, Eu. (Water Betony) Resembles the preceding +

243. Linaria vulgaris L. (Toad flax) Cathartic & diuretic +

244. Gratiola officinalis, Eu. (Hedge hyssop) Bitter purg. & emetic.

245. Verbascum (Mullein) Thapsus L. (Common mullein) Demulcent +

Order Labiatae. The Mint Tribe.

A great number of these abound in volatile & aromatic oils, many of which have been employed in medicine as aromatics & stimulants. Only the more important are here noticed.

246. Lavandula (Lavender) vera, Eu. (Common Lavender) Yields a fragrant oil, which is an ingredient of Spirit of Lavender, Eau de Cologne & Vinaigre aux quatre voleurs.



- Lavandula Stoechas, Eu. as used by the Arabs as an <sup>excellent</sup> antispasmodic.
- L. Spica, Eu. (French Lavander) Yields oil of Spike, - not medicinal
247. Mentha (Mint) viridis §. Eu. (Spearmint) Aromat. & Carmin.
- M. piperita §. Eu. (Peppermint) Pleasant aromat. Stimulant.
- M. Pulegium Eu. (Pennyroyal) Stim. & reputed emmenagogue
248. Lycopus (Water horehound) Europaeus, Eu. Astringent, & once a popular remedy (like the next) for hemorrhage +
- L. virginicus (Bugle weed) Mild narcotic & astringent
249. Salvia (Sage) officinalis, Eu. (Garden Sage) Aromatic & bitter
250. Rosmarinus officinalis (Rosemary) Eu. used to promote the growth of hair: & for preparing Hungary waler, Eau de Cologne &c -
251. Amaracus dictamnus, Candia. (Dictamn of Crete) Aromat. & tonic
252. Origanum vulgare §. Eu. (Wild Marjoram) Yields Oil of Thyme
251. Thymus vulgaris, Eu. (Thyme) & serpyllum, Eu. (Garden Thyme) are fragrant & stimulating
252. Hyssopus officinalis, Eu. (Hyssop) Stimulating stomachic.
253. Cunila mariana (Dictamn) Stimulating diaphoretic
254. Hedeoma pulegioides (American Pennyroyal) Aromat. & emmenag.
255. Melissa officinalis §. Eu. (Common Balm) Aromat. & bitter
256. Scutellaria lateriflora (Scullecap.) Used to cure hydrophobia +
257. Nepeta Cataria §. Eu. (Catnep.) Mild stim. & diaphoretic
- N. Glechoma §. Eu. (Ground Ivy) Tonic, diaphoretic &c.
258. Leonurus Cardiacus §. Eu. (Mother-wort) Said to be emmenagogue
259. Stachys Betonica, Eu. (Betony) Used as an ingredient of Cephalic snuff: its fine rigid hairs causing sneezing.
260. Marrubium vulgare §. Eu. (Horehound) Mild tonic & stimulant. - an ingredient of "cough candy"
261. Pycnanthemum. Many species of this genus are indigenous to the United States. They are all aromatic stimulants
262. Collinsonia (Horsebalm) Canadensis. Root tonic, astring. & diuret.
263. Monarda punctata (Horsemint) Yields a stimulating oil.
- M. didyma (Oswego Tea) Aromatic Stimulant & Diaphoretic (Many other N. Amer. species possess similar properties to the last.)

### Order Plumbaginaceae. The Leadwort Tribe

264. Statice Limonium, Eu. (Marsh Rosemary) Root a powerful astringent
265. Armeria vulgaris, Eu. (Thrift.) Diuretic

### Order Primulaceae. The Primrose Tribe.

266. Anagallis (Pimpernel) arvensis §. Eu. (Scarlet Pimpernel) Astringent & acid - once used as a remedy for cancer +.
267. Cyclamen (Snowbread) hederacefolium, Eu. Root very acid.

## Medical Botany.

### Order Plantagineae. The Plantain Tribe.

268. Plantago (Plantain) major g. Eu (Common plantain). Seeds mucilaginous & demulcent: leaves sometimes used for dressing blisters.

### Subclass IV. Monochlamydeae

Flowers furnished with a calyx only; or without floral envelopes.

### Order Phytolaccaceae. The Pokeweed Tribe.

269. Phytolacca dacandras (Pokeweed) Violently emetic & cathartic. Used for the radical cure of hemorrhoids. (See King, in Duglison's Journal)

### Order Chenopodiaceae. The Goosefoot Tribe.

270. Chenopodium anthelminticum. Yields oil of wormseed, a powerful anthelmintic.

C. Botrys g. Eu. (Jerusalem Oak) Tonic, expectorant & anthelmintic.

C. ambrosioides (Mexican tea) Tonic, antispasmodic & anthelmintic.

C. olidum, Eu. (Stinking Goosefoot) Antispasmodic & emmenag.

271. Salsola. The ashes of several species; such as S. Kali, Soda, arabica, & Fragus, yield Soda - or rather Carbonate of Soda.

### Order Nyctaginaceae. The Marvel of Peru Tribe

272. Mirabilis Jalapa (Four o'clock) The roots of this & other species are purgative.

### Order Lauraceae. The Cinnamon Tribe.

273. Cinnamomum (Cinnamon) Zeylanicum, Ceylon (True Cinnamon) A pleasant aromatic stimulant.

variety Capsia, E. I. A degenerate state of the preceding, according to Nees & Esenbeck. It produces Capsia lignea.

274. Camphora officinarum, Japan &c Produces ordinary Camphor

275. Persea gratissima, S. A. (Avocado Pear) Leaves balsamic

276. Sassafras officinale (Common Sassafras) Aromatic stem, & diaph.

277. Benzoïn odoriferum (Spice bush) Stimulant & aromatic.

278. Laurus nobilis, Asia minor & S. Eu. (Sweet Bay) Leaves & fr. aromatic.

### Order Polygonaceae. The Knotgrass Tribe.

279. Rumex (Dock) crispus g. Eu. The astringent root used for itch.

R. obtusifolius g. Eu. Root like the preceding.

R. Acetosella Eu (Common Sorrel); R. Acetosella g. Eu. (Sheep Sorrel)

& R. scutellatus, are acid, & employed as refrigerants & diuretics.

R. alpinus, Eu. (Monk's Rhubarb) Root purgative.



## Medical Botany.

280. Rheum (Rhubarb) This is a genus of many species, most of which are natives of Siberia, Tartary, & the northern mountains of India. Several of them produce the official rhubarb, but which, it is difficult to determine with certainty. The principal region that affords it, is in the heart of Thibet.

R. Emodi, E.I.. Produces a valuable kind of rhubarb, but it is more tonic & astringent than the ordinary kind.

R. rhaponticum, Europe & Caspian Seas, Siberia, &c. Root aromatic, bitter & astringent.

R. undulatum, China & Sib.. Produces a specious kind of rhubarb.

R. compactum, Tartary, China. Root not valuable -

R. palmatum, China, Thibet. This is generally regarded as the source of true official Rhubarb, but Lindley thinks the matter is doubtful.

R. crispinervium, a species lately introduced into England, - probably from Siberia, & strongly resembling genuine rhubarb.

281. Rumex (Dock) crispus & Eu. (Common curled Dock) Root astringent - used to cure Itch.

282. Polygonum Hydropiper, Eu. (Water pepper) Leaves very acid.

P. Bistorta, Eu. (Bistort) A powerful astringent.

P. Fagopyrum, Eu. (Buckwheat), a valuable article of diet.

P. amphibium, Eu. Roots used as a substitute for Santaparilla.

### Order Myristicaceae. The Nutmeg Tribe.

283. Myristica moschata, E.I.. The fruit yields both nutmegs & macis.

### Order Thymelaceae. The Mezereum Tribe.

284. Daphne Mezereum, Eu. The bark is used as a vesicatory of mastica.

D. Laureola, Eu. (Spurge Laurel) Whole plant very acid.

285. Lagetta lintraria, W. I. (Lace bark) Bark like Mezereum.

286. Dierca palustris (Leather wood) Bark acid & emat.; fr. narcot.

### Order Santalaceae. The Sander's-wood Tribe.

287. Santalum paniculatum, Sandwich Ids.

S. myrtifolium, India. This & the preceding yield the Sandal wood of Commerce.

### Order Aristolochiaceae. The Birthwort Tribe.

288. Aristolochia (Birthwort) A numerous genus, most of the species have roots of a strong, bitter, aromatic taste. Several are used in their native countries as emmenagogues, anthelmintics, & as antidotes for the bite of poisonous animals.

# Medical Botany

- A. Serpentina (Virginian Snake-root) Stimulant, tonic & antispasmodic.  
 289. Asarum Europaeum, Eu. Root purg. emet. & diuretic.  
A. Canadense (Cott. foot Wild ginger) Aromat. tonic, stim. & diaphor.

## Order Euphorbiaceae. The Spurge Tribe.

290. Croton Cascarilla, W.I. Said by some to produce Cascarilla Bark, but others doubt, & think the bark is produced by the next species.

C. Eleuteria, W.I. Lindley, Don & others think this produces the true Cascarilla.

C. Pseudo-china, Mexico, Bark a valuable medicine, like Cascarilla.

C. Tiglicum, E.I. Produces the ~~po~~ drastic purgative Croton Oil.

Many other species of Croton are medicinal; but not yet official.

291. Ricinus communis, E.I. The seeds yield the well known Castor oil.

292. Jatropha Curcas, E.I. (Physic nut) Seeds violently emetic.

293. Jariphia Manihot, Brazil. The prepared fecula of the root is called Cassava & Tapioca.

294. Hevea Guianensis, Guayana. Produces Caoutchouc.

295. Hippomane mancinella, W.I. (Manchineel) Juice an acrid poison.

296. Hura crepitans, W.I. (Sandbox) milky juice venomous: seeds drastic.

297. Euphorbia. The drug Euphorbium is produced by several African species of this genus.

E. Specacuantha. Root a cathartic & emetic: in small doses, diaph. & expectorant.

E. corollata. Cathartic & emetic. Resembles Specacuantha.

E. hypericifolia (Milk purslane) Astringent, alterative & emmen.

## Order Piperaceae. The Pepper Tribe.

298. Piper nigrum, E & W.I. (Black pepper) Dried berries hot stimult.

P. longum, E.I. (Long pepper) Fruit very pungent.

P. Betle, E.I. Leaves stimulating narcotic: produces intoxication.

P. Cubeba, Java. The ripe fruit is called Cubeb.

P. Caninum, Java. Also produces Cubeb.

## Order Amentaceae.

### Suborder Salicinae. The Willow Tribe.

299. Salix (Willow) The bark of most (all?) of the species of this numerous genus, contains a principle called Salicine, which is sometimes used as a substitute for Quinia. The most important medicinal kinds are, S. Russelliana, alba, & pentandra. The N. Amer. species have scarcely been examined as to their medicinal properties. S. nigra, however, is used as a tonic & febrifuge.

300. Populus (Poplar) nigra, Eu. (Black poplar) The young buds are aromatic, & are sometimes made into an ointment for wounds &c.



Order Urticaceae. The Nettle Tribe.

301. Urtica (Nettle) Most of the species of this genus are armed with stinging hairs which produce intense pain when they touch a person's skin. Some of them are so venomous as to cause dangerous inflammations, or even death. None are used in medicine.
302. Humulus Lupulus (Hops) Eu. The ripe fertile aments are Hops. They are bitter & are said also to be narcotic - but this is doubtful.
303. Ficus (Fig.) The juice of some species is poisonous - & that of others yields Caoutchouc.
- F. Carica (Common Fig) As. Fruit slightly aperient: used for confections.
304. Cannabis sativa, E.D. (Hemp). Powerful stimulating narcotic. In the East the dried leaves are often mixed with Tobacco for smoking.
305. Morus (Mulberry) nigra, Persia (Black Mulberry) Fruit cooling & laxat.
306. Dorstenia (Contrayerva) - The officinal article is produced by several S. American ~~species~~ & W. Indian species, particularly by D. Contrayerva, & D. Braziliensis.
307. Antiaris toxicaria, Java, &c (Uras) A most virulent poison.

Order Amentaceae, Suborder Betuleae. The Birch Tribe  
[This, & the other suborders of Amentaceae, should have followed Salicineae on the preceding page.]

308. Betula (Birch) lentia (Cherry Birch) The bark is aromatic.
309. Alnus (Alder) glutinosa Eu. Bark astring. & febrifuge.

Suborder Cupuliferae. The Nut Tribe.

310. Quercus (Oak) The bark of most of the species is highly astringent. Q. tinctoria (Black Oak) yields Quercitron bark. Q. infectoria, As. minor, produces gallnuts.

Suborder Myricaceae. The Gale Tribe.

311. Myrica Gale, Eu. (Sweet Gale). Infusion used for itch & as a vermif. M. cerifera (Bayberry) Bark of the root acid & astring.; also emet.
312. Comptonia asplenifolia (Sweet Fern) Tonic & astringent.

Suborder Pyracifluae.

313. Liquidambar styraciflua (Sweet gum). In the Southern State it yields a fragrant turpentine which contains no Benzoic acid. The liquid Storax of the shops is produced by L. Altingia & L. orientalis.

Medical Botany.Order Juglandaceae. The Walnut Tribe.

314. Juglans cinerea (Butternut) Extract of the bark a mild cathartic.

Order Ulmaceae. The Elm Tribe

315 Ulmus (Elm) The inner bark of several species is demulcent & mucilaginous. U. fulva affords the Slippery Elm of the shops.

Order Cycadaceae

316. Cycas revoluta, Japan & C. circinalis, E. I. produce a kind of Sago

317 Zamia. The trunk of several W. Indian species yields a sort of arrowroot; of a beautiful white fecula is obtained of Z. integrifolia a native of Florida: this last is the Coontee of the Seminole Indians

Order Coniferae. The Fir Tribe

318. Pinus (Pine) sylvestris, Eu. (Scotch Fir) Yields Turpentine

P. Pumilio, Eu. Produces Hungarian balsam

P. Pinaster, Eu. Produces Bordeaux turpentine.

P. Palustris (Yellow Pitch Pine) Produces most of the American turpentine, from which Spirit of Turpentine is distilled

319 Abies (Spruce & Larch) picea, Eu. (Silver Fir) Produces Strasburgh Turpent.

A. balsamea (Balm of Gilead) Yields Canada Balsam.

A. Canadensis (Hemlock Spruce) Stimulant, Diuret., & rubefac.

A. Larix, Eu. (Common Larch) Produces Venice turpentine

320. Juniperus communis, Eu. (Common Juniper) Berries stim. diuret.

J. Virginiana (Red Cedar) Strongly resembles Savin.

J. Sabina, Eu. ad. (Savin) Externally rubefac. & vesic.: intern. emmen.

Suborder Taxaceae. The Yew Tribe.

321. Taxus baccata, Eu. (European Yew) Leaves & seeds narcotic.

T. Canadensis seems to have similar properties to the European species.

Class II. EndogenaeSubclass I. Rhizanthae

Fungoid parasitical plants

Order Balanophoraceae

322. Cynomorium coccineum Eu. Formerly used as an astringent, under the name of Fungus Melitensis



# Medical Botany

## Subclass II. Floridae

Leafy plants with the floral envelopes verticillate

### Order Scitamineae. The Ginger Tribe.

323. Zingiber officinale As. The rhizome is ginger.

324. Curcuma Zerumbet, E.I. & C. kedondong, As. produce

Zedoary, a substance resembling ginger, but milder

C. longa, E.I. produces Turmeric

325. Amomum Cardamomum E.I. said to produce the round Cardamoms.

A. Grana Paradisi, As. (Grains of Paradise) Seeds aromat. & cordial.

326. Elettaria Cardamum E.I. (True Cardamom) Seeds aromat. & pungent.

327. Alpinia Galanga, Sumatra. The roots are Galanga major of the shops: a pungent-acrid aromatic.

### Order Orchidaceae. The Orchis Tribe

328. Orchis Several species of this genus produce Salep.

329. Vanilla claviculata, H.I. produces the fragrant Vanilla of commerce

### Order Marantaceae. The Arrow-root Tribe.

330. Maranta arundinacea, H.I. The tubers yield Arrow-root.

### Order Musaceae. The Banana Tribe.

331. Musa sapientium H.I. (Banana) & M. paradisiaca E.I. (Plantain) produce large fleshy nutritious fruits.

### Order Amaryllidaceae. The Amaryllis Tribe.

332. Several genera of this order produce poisonous bulbs. In the common Narcissus & Daffodil the poisonous matter is so diluted as merely to prove emetic or cathartic.

### Order Dioscoraceae. The Yam Tribe.

333. The roots of several species of Dioscorea are used instead of Potatoes, & are known by the name of Yams. D. villosa is emet. expect. & diaphoret.

334. Tamus communis Eu. Root acid.

Medical Botany.Order Iridaceae. The Flag Tribes.

334. Crocus sativus, Eu. Saffron is the large stigma of this plant.  
 335. Iris (Flag) florentina, Eu. The rhizome is orris root. Aromatic.  
I. pseudacorus Eu. Rhizome acid, purgative & emetic.

Order Bromeliaceae. The Pine-apple Tribe

336. Ananassa sativa W.D. (Pine-apple) Subacid & cooling.

Order Smilacaceae. The Smilax Tribe.

337. Smilax. Several tropical species of this genus are mixed in the official Sarsaparilla, but only one species seems to yield the genuine drug. Most of the official article is spurious & inert. S. Sarsaparilla does not appear to be medicinal. The rhizome of S. hastata & probably of other species, yields a reddish fecula which the Florida Indians prepare in large quantities for food.

S. China produces the China roots of the shops.

S. Pseudo China. The rhizomes are used in the diet drinks of irregular practitioners in the Southern States.

Order Liliaceae. The Lily Tribe.

338. Erythronium americanum (Dog's-tooth Violet) Root & stem emetic.  
 339. Aletis farinosa. An intense bitter. Tonic: used in chronic rheumatism.

340. Scilla maritima, Eu. (Scuill). Bulbs emet., diuret. & expect.

341. Allium Ceba, Egypt. (Onion) Stimulant, diuret., fetid.

A. sativum, Eu. Local irritant: internally stim., expect., diuretic.  
 stinks more than the preceding.

342. Aloe socotrina, Socotra. Yields the bitter purgative Socotrine Aloes.

A. vulgaris, E.S. & Af. Produces Barbadoes or Hepatic Aloes.

A. spicata, C.G.H. Yields Cape Aloes & Horse Aloes.

Order Melanthaceae. The Colchicum Tribe

343. Veratrum viride (Green Hellebore) Roots acid, emetic & powerfully stimulant, - followed by sedative effects.

V. album, Eu. (White Hellebore) Resembles the preceding

V. angustifolium. active like the preceding

V. Sabadilla W.J. Produces Sabadilla seeds, a source of the vegetable alkali Veratria, a violent local stimulant. Used in gout, rheumat. &c.



344. Helonias erythrosperma. A narcotic poison. used to kill flies.

H. dioica (Blazing Star) Root tonic & anthelmintic

345. Schoenocaulon officinale, Mexico. Produces a part of the Sabadilla seeds of commerce

345. Colchicum autumnale, Eu (Meadow Saffron) acid narcot. & emat.

### Order Trilliaceae.

346. Trillium erectum, grandiflorum &c. Roots said to be violently emetic: but the "unlicensed faculty" say they are astringent, tonic & alterative.

347. Medeola Virginica (Indian Cucumber) Diuretic; hydragogue

### Order Palmaceae. The Palm Tribe.

348. Sagus laevis, Sumatra & Molucca. (Sago Palm) The cellular part of the trunk, & that of ~~several~~ several ~~of the~~ of the ~~trunk~~ trunk the next

349 Caryota urens, E. I., are the principal sources of Sago

350 Cocos nucifera, W. I. produces Cocoa nuts.

351. Phoenix dactylifera Eu. As. produces Dates

### Order Araceae. The Arum Tribe.

352. Arum maculatum, Eu. (Wake Robin) Tubers farinaceous, mixed with a volatile acid poison. The latter is removed by heat & washing leaving a kind of fecula called Portland Sago.

A. triphyllum (Indian Turnip). Rhizoma violently acid; dried, amy-  
= laceous & harmless.

353. Symplocarpus foetidus (Skunk Cabbage) Root of seeds antispasmodic.

354. Dieffenbachia Seguina W. I. (Dumb cane) A very venomous plant.

### Order Acoraceae. The Sweet Flag Tribe.

355. Acorus Calamus, Eu. The rhizoma is called Calamus or Sweet Flag

### Subclass III. Glumaceae.

Leafy plants with the floral envelopes imbricated

### Order Graminaceae. The Grass Tribe

356. Lolium temulentum, Eu. (Darnel) Seeds a narcotic poison

357. Triticum vulgare, As. (Wheat) The principal source of starch

358 Hordeum vulgare, As. (Barley) Pearl Barley is official

## Medical Botany.

359. Secale cereale. As. (Rye). Produces Ergot.  
 360. Bromus (Brome grass). mollis. Eu. Narcotic.  
B. purgans & Catharticus, S.A. grains said to be emet. & purg. +  
 361. Avena sativa (Oat) Oat meal is a light nourishing kind of food.  
 362. Andropogon (Beard grass) Some species aromatic.  
 363. Saccharum (Sugar cane) Sinense, China. Produces China Sugar  
S. officinarum, S.D. Produces common Sugar.

### Order Cyperaceæ. The Sedge Tribe.

364. Cyperus (Galinsale). A few species produce tubers, which contain fecula, a mild astringent, & a feeble aromatic principle.  
 364. Parox (Sedge) The creeping stems of several species are said to be diaphoretic, demulcent of alterative; & are known in Europe by the name of German Sarsaparilla.

## Flowerless Plants

### Class<sup>III</sup> Aitheogamous or Semivascular Plants

#### Order Lycopodiaceæ. The Club moss Tribe

365. Lycopodium (Club moss) clavatum Eu. The spores of the thecae, are called Lycopodium. Used to cure Plica polonica, & to prevent excoriation in children.

L. Selago. Eu. Internally, an emetic: externally used as a counter irritant, in the form of ointment. - also to keep blisters open.

#### Order Filices. The Fern Tribe

The rhizomata of some are astringent, & occasionally aromatic.

366. Polypodium (Calaguala) S.A. Sudorific, antispasmodic & febrif.  
 367. Adiantum (Maidenhair) Capillis Veneris. Eu. Pectoral: used to make the syrup Capillaire. +  
A. pedatum. Said to be pectoral & lenitive.  
 368. Pteris Aquilina, Eu. (Common Brake) Anthelmintic +  
 369. Nephrodium (Shield Fern) Felix mas. Eu. Anthelmintic. The oil of Fern is extracted from the rhizome by ether.  
 370. Aspidium acrostichoides. Said to be anthelmintic.  
 371. Osmunda regalis, Eu. (Osmunda Royal) Rhizoma tonic & styptic.



Class IV. Amphigamous or Cellular Plants.

Order Fungaceæ. The Fungus Tribe

372. Ergotæcia abortifaciens. The fungus that produces the diseased condition of the grain of Rye, known by the name of Ergot.

See a paper by Mr. Zuechelt, in the Linnæan Transactions, vol. XVIII.

373. Pachyma Cocos. A subterranean fungus of Georgia of the Carolina called Tuckahoe. (Sclerotium giganteum, Torrey in Med. Repos. 1819) Used medicinally in the South - but the properties are not well ascertained. Consists almost entirely of Pectic Acid.

P. tuber regium, Moluccas. Resembles the preceding. Used for diarrhoeas.

374. Tuber Cibarium, Eu. A subterranean fungus called Truffle.

375. Agaricus. An immense genus, including several edible species, the principal one of which is A. campestris or Common Mushroom.

Many species are highly poisonous, & several produce a kind of intoxication.

Order Lichenaceæ. The Lichen Tribe

376. Cetraria Islandica Eu. as. (Island Moss) Bitter & gelatinous.

The species of Varolaria, Parmelia parietina, & many others are very bitter. Others - such as Gladonia rangiferina, Eu. (Reindeer moss) & Cetraria nivalis Eu. are nutritious, with but little bitterness.

377. Gyrophora. Several large species of this genus constitute the Tripe de Roche of the Canadians - a little bitter & gripping, but nutritious substance.

Order Algaceæ. The Sea-weed Tribe.

378. Fucus vesiculosus, Eu. &c. (Sea-torarin) Used in Scrophulous. This & other Fuci are probably efficacious from the Iodine which they contain.

379. Chondrus crispus, Eu. (Carrageen or Irish Moss) Yields a mild nutritive jelly.

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